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MOTOR AGE

Volume XXXVIII
Number 16

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, OCTOBER 14, 1920

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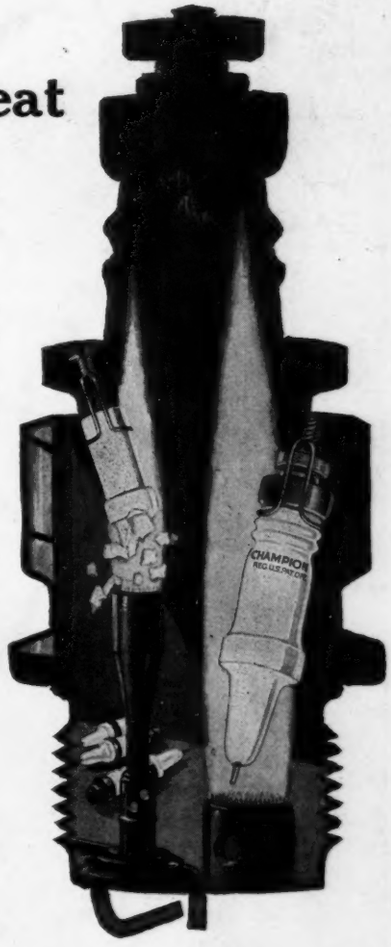

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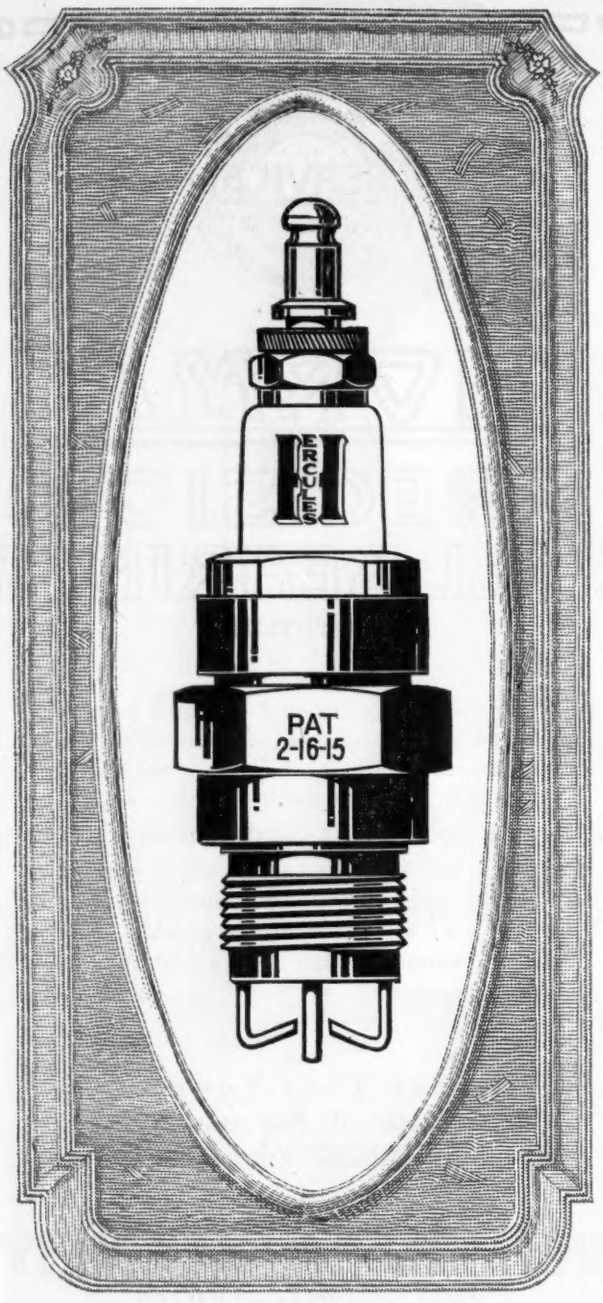

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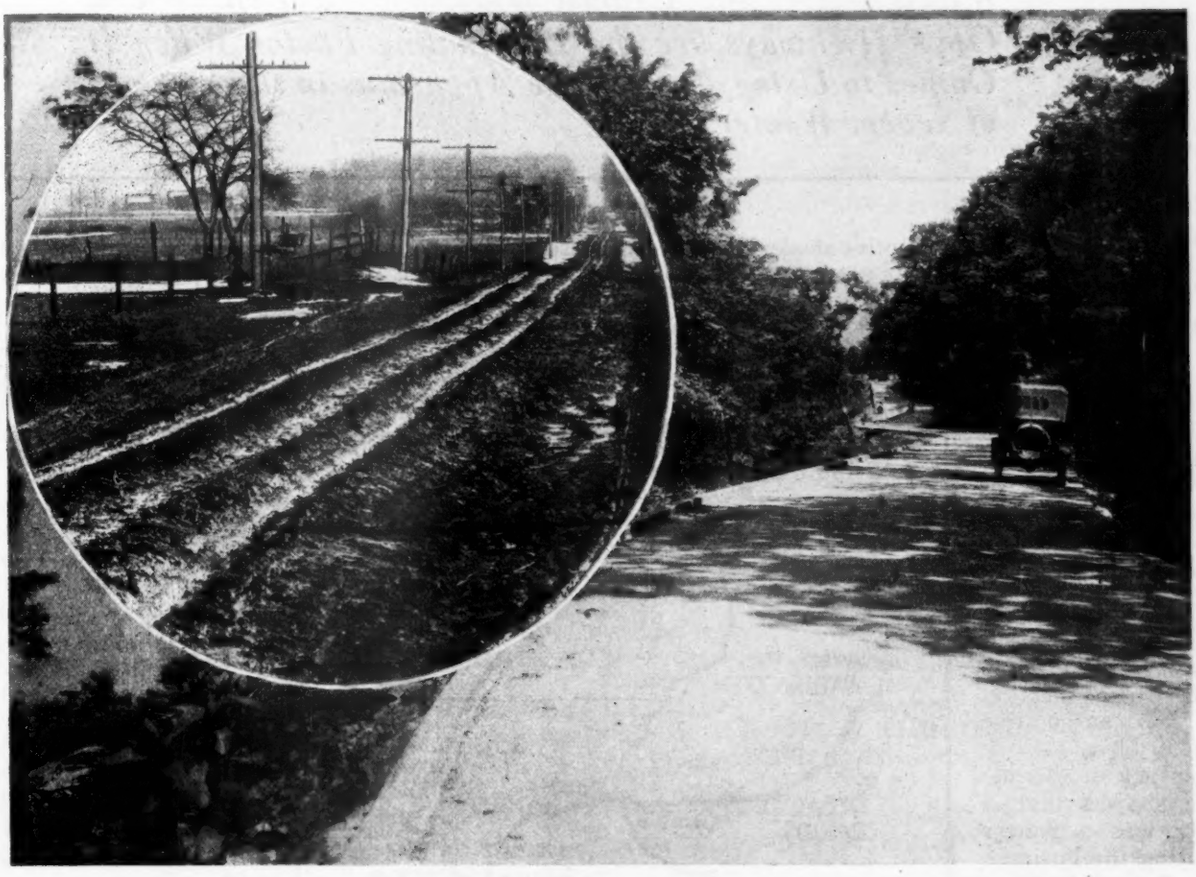
MOTOR AGE

What About Winter Business?

This is the Season of the Year When Automotive Dealers Living in Those Sections of the Country Where Deep Snow Abounds for Several Months Should be Planning Their Winter Work—After the Snow Comes It May Be Too Late



In the two pictures above lies the story of keeping the business going in the snow area of the country. Permanent roads mean there will be cars and trucks running more or less all winter and these vehicles will find their way into the dealers' service stations, but impassable roads mean stored cars and trucks and unless the dealer can get these vehicles in his place of business he will be the loser. The work of overhauling the cars and trucks of farmers especially should be lined up before heavy snowfalls shut the gates of profits

Some Suggestions to Prevent the Winter Slump

1—*Get the Other Dealers of Your Town Together and Talk Things Over.*

2—*Try to Induce the Farmer to Leave His Car, Truck or Tractor With You for Overhaul Before Snow Comes.*

3—*Highway Commissioners Might Be Induced to Lend Their Services in Keeping the Roads Open Where Possible.*

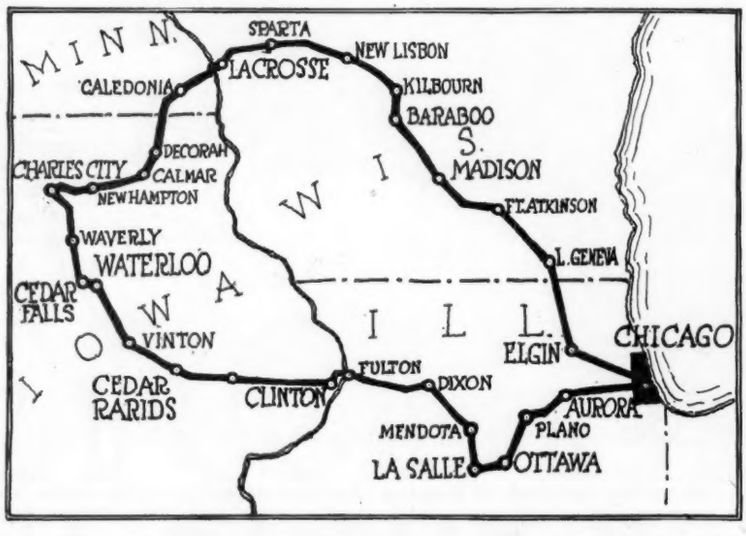
4—*Letters Should Be Sent to Farmers Reminding Them of the Fact That Now is the Time to Think About Leaving Their Cars, Trucks and Tractors for Overhaul.*

5—*Everybody Who Uses a Motor Vehicle of Any Kind Wants to Get the Utmost from Such a Vehicle and Open Highways are the Dominating Factor When It Comes to Using Automotive Apparatus in the Sections of Severe Winters.*

AS TO whether the automotive dealer operating in the smaller towns of those sections of the country where severe winters and heavy snowfalls prevail four months out of the year will keep busy depends almost altogether on the kind of roads that exist in his territory and whether they are kept clear for traffic. This fact was brought out in a recent trip through four states by representatives of Motor Age. If the town in which the dealer does a slim business in winter, if he depends upon the rural trade, unless he operates some other sort of business in connection with his automotive business.

A survey of the situation showed that it largely was a matter of getting the business of the farmer in time. That is, if the farmer can be induced to leave his car, truck or tractor with the dealer or with the man operating a service station, all well and good. But, most farmers want to make use of their cars as long as possible and then along comes a heavy downfall of snow and his car becomes snowbound until Spring, which brings with it the usual peak load of service work.

Dealers interrogated were almost unanimous in their statements that the business was there to be had, but it was a case of getting the business into the shop or service station early in the winter. One dealer living in a town of a few thousand people and surrounded by roads none too good said winter business in his town was not nearly as good as in the next town, a smaller one, because the latter town was the intersecting point of several excellent roads, and it was a comparatively easy matter to get the farmers' business by virtue of these roads.



Route taken by representatives of MOTOR AGE to get a line on winter business conditions

Thus, it would appear the problem is one that centers about two things:

1—*Good roads.*

2—*Getting the farmer's trade early in the winter.*

We place good roads first because with a hard surfaced road it is not so difficult a problem to drive to town even in a moderately heavy snowfall. It also is possible to clear a hard surface road easier with a tractor and snow plow because of the better footing.

Naturally, the problem of keeping the open highways brings with it the question as to from where the apparatus for cleaning off the snow is coming. Several things are possible and the most important one is that all the dealers selling and servicing trucks should go after this highway clearing proposition as a unit. Individually, a dealer can do little, but collectively things can be attempted that may result in each dealer having at least some winter work. It is better to put forth a little effort and have the shop running part of the time than to close the shop altogether because no owner could use the roads to get in.

In the smaller communities where rural trade is largely depended upon to sustain the business during the winter, dealers know one another much better than in large cities and, therefore, the matter of organizing should not be so difficult. After organizing comes the laying of plans for action to be taken.

A summing up of the equipment at hand may show several tractors or motor trucks that can be fitted out with suitable plows or scrapers and one or two of these sent out in various directions can do considerable work in opening the highways. It may be possible to get the merchants of the town, the banks and the farmers interested in the proposition, because everyone is bound to benefit in some way. The farmer wants to drive to town and the merchant wants him to come. The more business done in a town, the more likely is the automotive dealer to keep busy.

The help of the highway commissioners should, of course, be sought and where roads are patrolled as in southern Wisconsin, this should not present a very difficult problem.

The question of highways is not so important to the dealer if he has been able to get plenty of work lined up to carry him over the winter. The chief opposition here seems to be the farmer, who is reluctant to part with his motor car, especially, before the snow comes. By this it is not meant that the farmer should leave his car with the dealer in the late fall or even when a little snow comes, but before that snow comes which ties up the roads for three and four months at a time. In certain parts of Iowa, for example, roads were snowbound for five months last winter and the dealers will tell you there were plenty of cars to be overhauled and the owners were willing to have the work done, but neither man or beast could get the work to town.

In planning this winter's business the dealer who caters largely to the farm trade must bear in mind the uneasiness of the farmer over the present break in grain prices. This situation may have the effect that the farmer will hold off on any kind of overhauling or repair work. Authorities tell us that the prices of farm crops are below costs of production. The secretary of the Iowa Farm Bureau has this to say:

"In the present break of grain prices the expected has happened. In fact, it has been predicted for weeks, or ever since the prospects of a good crop were apparent. The farmer today is showing strong tendencies toward uneasiness. This is not surprising when one takes into consideration the large loss incurred last year in raising and feeding livestock, which naturally tended to make him cautious and caused him to curtail his operations along these lines. Now he comes on with a large crop and finds that the men who presume to form a basis for crop values upon what may be best termed visible conditions upon the farm are giving no consideration to the economic side of the question."

In sections where roads are fairly good it is possible to keep the highways open by use of a tractor and snow plow or scraper. Collectively dealers might do much in co-operating with highway commissioners in clearing the roads and thus stimulate business

An impression of the increasing importance of keeping the roads open during winter is shown in the fact that The National Automobile Chamber of Commerce is conducting a series of lectures in the Middle West so that every highway department and local road official will be prepared to remove promptly any snow fall that may threaten to tie up traffic. At the first meeting at Cleveland it was explained that the work of clearing roads of snow in Ohio is entrusted to the State Highway Department and county and township officials. The government has given the State Highway Department more than 500 left-over army trucks, and it was urged that these be equipped with snow plows for use next winter. Some of the trucks were so equipped last winter and they gave excellent service. The traffic men of the automobile manufacturers unanimously agreed to devote their best efforts toward influencing the Highway Department to purchase additional snow plows before winter set in. The Federal Bureau of Roads is giving engineering advice on how to be rid of the snow nuisance, and is carrying on extensive propaganda for campaigns.

Officials of Michigan highway departments are preparing campaigns to keep the roads in condition for travel throughout the winter. Now is the time for dealers to band together and lay plans for concentrating the available equipment and labor to fight the snow that causes a drop in the winter sales curve.

The Dealer Must Analyze His Territory Before Selecting a Tractor Line

He Must Consider the Topography, Crop Characteristics, Soil Characteristics, Size of Farms, and Past Achievements of Tractors. The Dealer Who Carefully Investigates These Should Have No Difficulty in Taking On the Right Design, and He Will Be Selling a Tractor His Prospects Can Use Profitably

IN ONE respect the problem confronting the tractor dealer and that confronting the tractor manufacturer differ radically. The manufacturer has to find a market for the tractors he builds; the dealer has to find a tractor which will fit his market.

At first one might think that the manufacturer had the more difficult of the two. The direct contrary is the truth. No matter what kind, type, size or sort of tractor the manufacturer builds he always can find some place where it will sell and in quantities which will take care of anything but extraordinary production.

The dealer, on the other hand, is called upon to select from the hundred or more varieties of tractors, and from twice or more that number sizes of tractors, that particular machine which will come the nearest to meeting the average need of his particular locality. The solution of the dealer's problem is, therefore, incomparably the more difficult of the two. With the dealer, a mistake is quickly and irremediably fatal. It is impossible for him to take the chance the manufacturer takes because he has, relatively speaking, far more at stake and results, good or bad, are more rapid and certain.

Thus it happens that the most vitally important thing for the dealer is that he shall make his choice of tractors intelligently, and know exactly what he will have to rely upon in the way of prospective customers.

THE very fact that the average dealer operates in a territory which is comparatively small makes the solution of his problem more vitally important. At the very best he can hope to sell only a few machines. One of the old line implement manufacturers of the country takes the view that if the ordinary dealer sells as many as eight tractors in a year he may be accorded the title of "good dealer." Some dealers sell many times that number. Occasionally a dealer will sell one hundred, or even two hundred tractors in the course of a year. Of course, dealers who do as well as this are exceedingly rare, but it is nothing uncommon to find dealers selling from fifty to seventy-five. Compared with the thousands of tractors sold by single manufacturers, such a trade as this, numerically considered, looks small, but relative speaking, it is very important, because it is the dealer's all. This being the case it is plain that he cannot afford to make a mistake in selection.

HOW unsafe it is to rely too much upon general considerations may be illustrated by one or two instances. Take New England, for instance. This is preeminently a 2-plow tractor territory. The farms are small and the amount of trade the average dealer can hope to get will be small numerically. Yet there are sections of New England where the majority of the demand, while still for a small tractor, is industrial rather than agricultural, and a dealer in such a locality must select that tractor which will sell industrially. There are other sections of New England where the character of the crops grown makes possible the use of a tractor larger than the predominant 2-plow size.

Go to the opposite extreme of the continent and consider California. The bulk of the tractor demand in this section will be for the orchard type of tractor which usually will be of the 2-plow size. Yet there are many dealers in California who will do business in sections where the bulk of their demand will be for open field work and where the predominant demand will be for the larger type of wheel or tracklaying tractors. The dealer who would estimate his probable requirements in any locality must know these things.

The Five Prime Factors

It happens that there are certain factors which are common to all localities upon which the dealer may rely for information. These always are:

Topography
Crop characteristics
Soil characteristics
Size of farms
Past achievements of tractors

The dealer who will carefully investigate these hardly can go far wrong in his selection of a machine.

Topography is largely a matter of local interest. The territory of a certain dealer, for instance, may be hilly or rough, while all of the surrounding territory is level. Or a dealer may be fortunately located in a valley, for example, while all of his nearest competitors will be in the hills. Therefore, what the general character of the dealer's immediate vicinity may be will be will have a first rate importance in deciding upon the type of the tractor he will select.

A notable instance of this is afforded in the Northwest. There are many orchard districts in Oregon and Washington. With two exceptions these districts are indifferent as to whether the dealer sells a wheel type tractor or a tracklayer type, just so it is of the size and dimensional proportions demanded for orchard work. Yet in the Hood River district, lying on both sides of the Columbia river and thus in both states, the configuration of the land is such, the size of the orchards is such and the character of the soil is such that hardly anything but a small tracklayer will meet the requirements.

Some small wheel type tractors are sold even here, it is true, but the predominant demand and the preponderance of satisfaction in performance go to the small tracklayer. Nor are such contrasts in nearly adjacent districts rare in other sections of the country. There is such a glaring contrast here that it is instanced as a case where the dealer very easily can make a mistake.

Crop characteristics are more general in their nature and affect larger areas. There are more or less well defined limits to the corn belt, the cotton belt, the

winter wheat belt and the spring wheat belt. Irrespective of topography the predominant character of the crops grown in any dealer's territory will be determined very largely by the character of the crops grown in the district as a whole. Thus, for instance, while there is a considerable acreage of small grain in Iowa which must be taken into consideration, the state has more than 10,000,000 acres of corn and in the territory of every dealer there will be sufficient corn to make it a factor in determining the size and type of tractor he will sell most readily, and also the same factor will be determinative of the amount of attention he will be wise to pay to such supplementary motorized farm equipment as the motor cultivator.

Taking Texas, as another example, and the dealer will have both cotton and corn to consider. Texas has over 10,000,000 acres of the former and over 6,000,000 acres of the latter, and the dealer should be guided accordingly. Here for instance, too, there are difficult soil conditions to take into consideration, demanding a 3 or 4-plow tractor with a considerable reserve power, either in the wheel or the tracklaying types, in connection with a vast potential demand for the motor cultivator for both cotton and corn.

The Size of the Farm

Or take the winter wheat districts of Kansas and Nebraska and the spring wheat districts of the Dakotas and Minnesota. For the most part the farms throughout this section are level and large, the soil varies all the way from light to gumbo, and the character of the crop is practically uniform.

The dealer throughout all of this region will hardly have a doubt when it comes to selecting a 3 or 4-plow tractor of ample power, either of the wheel or tracklaying types, and which will have special reference to uses on the belt. It must be evident that in the small grain areas there will be relatively a larger use for the belt power of a tractor than there will be in corn or dairying areas.

The size of the farm is a very important matter in determining the size of tractor which likely will be most in demand. Generally speaking all of New England, the Southeast and South and the Central West as far as the Illinois line will absorb more 2-plow tractors than will other sections of the agricultural country, while here and there will be sections where a larger type of machine will sell readily. Such areas are to be found on the east coast of Maryland, in some parts of New York and Pennsylvania, in the tobacco growing district of Connecticut and in Georgia, for example. But it is safe to estimate that in every part of the country where the farms are less than a quarter section on the average the demand for 2-plow tractors will be largely in the lead over tractors of larger sizes. Likewise, where the farms run in excess of 160 acres, 3 and 4-plow tractors will predominate.

Thus the dealer will see readily that it will be necessary for him to go carefully into all of these factors before he comes to a final decision as to the type and size of tractor he will stock. What is common to his state or territory as a whole, modified by the topographical conditions of his immediate vicinity, will be a fairly safe guide for his preliminary conclusions.

But whatever these may happen to be they must be checked by his investigations into the past performances of the tractors which already have been sold in his locality. In all probability there is not a single locality in the entire country in which a tractor can be used at all which has not been tried out by tractors of various makes, sizes and types. The farmers, the dealer will find upon investigation, have very definite ideas of tractor performance and from them he can gleam a lot of information which will enable him to check up on the representations of any tractor manufacturer who tries to convince him that his particular machine is just the one for that vicinity. The dealer never should allow himself to be convinced entirely by the arguments presented by by the manufacturer.

Before Selecting a Tractor Line

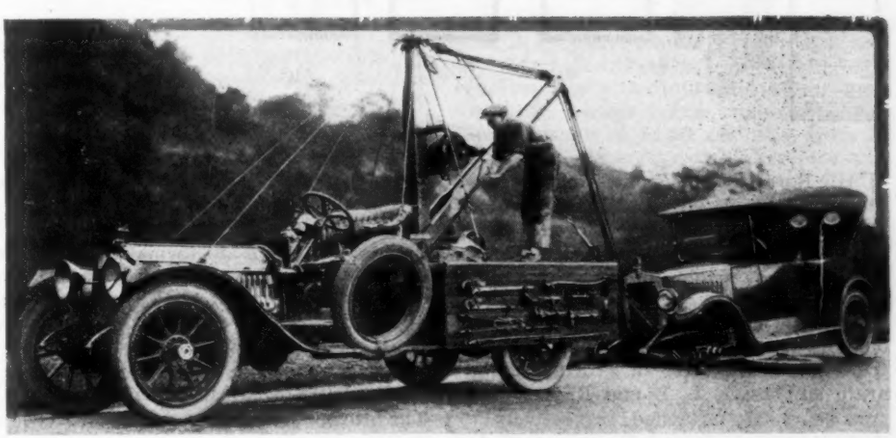
THE dealer must make no mistake here—if he does, his business is doomed to short existence. He can easily find out the past performances of tractors in his locality. The farmers have some very definite ideas of what they want and the dealer will then be able to compare them with the claims of the tractor manufacturer. The dealer should never allow himself to be convinced solely by the manufacturer's arguments.

It will be remembered that at the outset it was said that the dealer problem was a more difficult one than the manufacturer problem and for this reason he should approach its solution with a more intimate and complete knowledge of the local facts. The manufacturer is swayed by considerations that well may take in a continent; the dealer must be influenced by the facts that pertain to a county or less, and thus the success of the dealer will depend upon a much more minute investigation and estimation of the factors which will affect his business.

Careful Analysis Needed

Of course, every reader must understand the impossibility of making specific recommendations for any section of the country or for any dealer's territory. In an article such as this it is impossible to go farther than to present some general indications and to try to point out how such can at the best be but a broad basis for the dealer's consideration. The real things which ultimately will decide him in favor of this or that machine will be more minute and are to be found only through a close, intelligent and attentive examination of his own locality. This is, in fact, the most important thing for the dealer to do and only by doing it can he feel sure he has found the correct solution to the problem which confronts him.

Get Extra Business with a Service Truck



"No ditch too deep, or car too heavy," is what Harry Single, of Cincinnati, claims for this unique service truck, or "trouble-wagon," after trying out his invention for a month. He built the truck out of an old Packard. Then he erected the crane on it which is strong enough to pull a 4500 lb. car up a 300 ft. embankment. The sides of the truck are hinged and may be raised to form a bed twice as large as when let down. To these sides he has strapped all kinds of implements. On one side are crow-bars, axes, wire-cutters, wrenches, and hammers; on the opposite side are shovels, saws, jacks, picks and sledge-hammers. In the bed of the truck are compartments for all kinds of small tools. The crane picks up the wreck and rests it on the step on the rear of the truck. If the rear wheels are in running order, the front axle is rested in the U-iron pinioned on the rear

Operation and Care of the Ford Gearset

A Clear Explanation of the Principles Upon Which the Planetary Transmission Operates, Valuable to the Dealer and Repairman. Study and Save This Instruction.

THE planetary transmission as used on the Ford, because of its great difference from other gearsets, is very frequently misunderstood. A clear understanding of the manner of operation of this gearset and an analysis of the causes of trouble in mind, will aid greatly in performing any service work on the gearset that may be brought in. At first, the manner of operation is taken up. It is suggested that the diagrams of the gear relations be carefully studied and the operation of them visualized, for only in this manner can one obtain a working picture of the operation.

WITH an anlysis of the causes of trouble in this gearset before one, it is possible to ask the owner a number of intelligent questions which will give a clear insight as to just what is wrong.

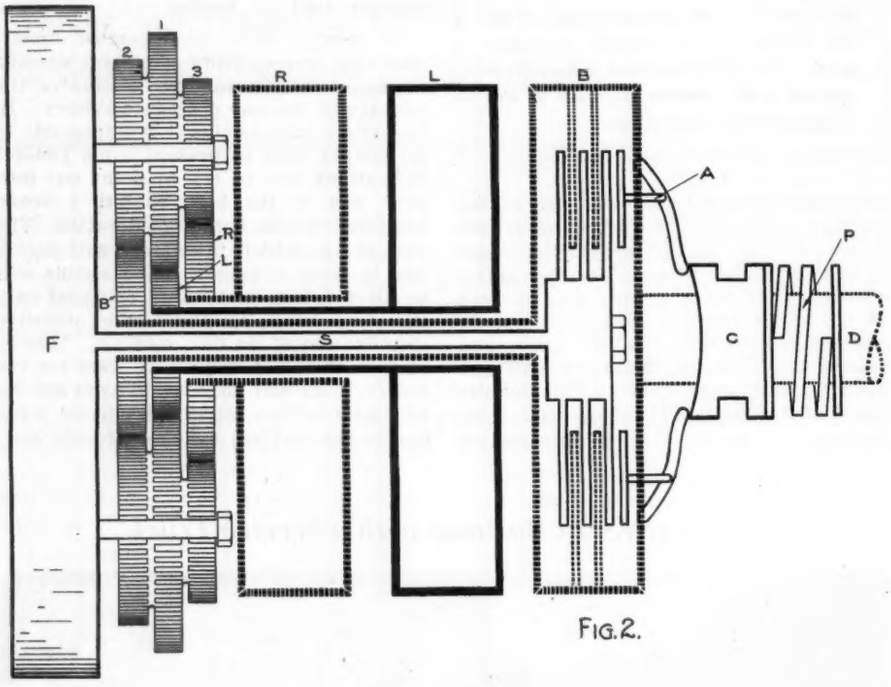


FIG. 2.

THE Ford transmission is incorporated with the flywheel and referring to Fig. 2, the parts are as follows:

F is the flywheel to which are attached three sets of triple planet gears (only two shown), each set being three gears, 1, 2 and 3, cast in one piece and pivoted on pins attached to the flywheel. These triple gears are in mesh with three separate sun gears, L, B and R, but these sun gears are attached respectively to three drums, L, B and R, and are independent of each other as to rotation. The drums, B, L and R, have a contracting band each on their outer surface, which is operated by a foot pedal for the purpose of holding any one of the three gears stationary as required for the different speeds and brake.

The sun gear B is always the driven gear whereby we obtain the low and reverse speeds, through the drum to which the transmission shaft D is attached. The flywheel F is attached to the shaft S and can also be independent of the three sun gears and bands as happens when in neutral, but the end of S inside the drum B forms the driving member of the multiple disc clutch, the driven member being the drum B having attached the driven discs, the clutch being controlled by the fingers A and collar C.

All the gears are in mesh at all times. The three triple planet gears always moving as one and the three sun gears moving independently of one another.

The clutch pedal is attached to L, and when pressed all the way down contracts the band on L, holding this drum and gear L stationary, at the same time releasing the clutch by withdrawing the collar C and compressing the clutch spring P. When the clutch pedal is one-half way pressed down, it merely releases the clutch, and when all the way back it allows the spring P to compress the clutch.

The brake pedal is attached to the band on drum B and when pressed down merely contracts this band, braking the driven portion of the transmission which is always through the drum B.

The reverse pedal is attached to the band on drum R and when pressed down, contracts this band, holding the drum and gear R stationary.

The hand lever is connected to the clutch pedal and when pulled nearly all the way back, presses this pedal one-half way down, giving neutral, and when pulled right back, retains the neutral position and applies the emergency brake on the rear wheel brake drums.

High Speed Engagement—When the clutch pedal is allowed to come back, the collar C forces the arms A forward and compresses the clutch discs, locking the shaft S and the drum B; hence the shaft D must revolve the same speed as the flywheel, the power being from flywheel through shaft S, clutch discs, drum B and shaft D to the differential. The drums L and R also revolve but are idle.

Low Speed Engagement—In order to understand the action of the gears for the low and reverse speeds, let us first study the fundamental principle upon which they act, which is as follows:

In Figure 1A it shows a gear D, pivoted at B on the arm C which is assumed to move around the center A. As C revolves, it is obvious that the tooth X on the gear D will always be the nearest tooth to the center A and, therefore, as the arm C makes one revolution around the center A, the gear D will not move on its own axis.

Now let us assume that another gear (Fig. 1B), called L, having the same size and number of teeth as D, pivoted at A, is meshed with the gear D, and is held stationary by some means and not allowed to revolve, then let us again revolve the handle C around the center A. Now the tooth X will change its position as the gear D moves to the position two around the stationary wheel L, and it will then be at X2; in other words, the gear D will have turned one-quarter revolution on its own axis B. It will be seen that when the handle C has moved one

complete revolution around the center A, the gear D will have made one complete revolution around its own axis B in making one complete revolution around the stationary gear L, and all the teeth on each gear D and L will have been in mesh just once.

In the Ford gear the flywheel takes the place of the arm C, the triple planet gears replace D and the three independent sun gears are in mesh with the triple gears, replacing L.

When the clutch pedal is depressed all the way, it not only releases the clutch but causes a brake band to hold fast the drum L (Fig. 2).

As the flywheel, from which project the studs carrying the triple gears, revolves, it will be necessary for the gears to revolve on their own axis, since they are in mesh with the sun gears, one of which is held stationary, being attached to the drum L. (Explanation above.)

The number of teeth on the gears is as follows, reference being had to Fig. 3A: Planet gear one has 33, two has 27, and the sun gear L has 21 and sun gear B has 27, L being in mesh with one and B in mesh with two. (The gears three and R not being shown as they are for reverse.) The gear L is held stationary by the brake band and gear one which is in mesh with it will have to roll on it, since it is attached to the flywheel which revolves. Now, in order for the gear one to make a complete revolution on its own axis, it must mesh with thirty-three teeth on gear L (see Fig. 1A and B.) But gear L only has 21 teeth, therefore gear 1 must move completely around gear L and 12 teeth more, bringing it to position S (Fig. 3A.)

Now gear two with 27 teeth is fastened to gear one and must move one revolution on its own axis also and is in mesh with gear B with 27 teeth which is attached to the drum B and to the transmission shaft D. Since gear two in making one revolution on its own axis can only mesh with 27 teeth on gear B, also 27 teeth, and further, since it has to move the same distance as gear one, being attached to it, gear B must be pushed around slowly from O to position S in order to mesh 27 teeth only with gear two. Thus the drum B and transmission shaft only moves a distance of 12 teeth while the flywheel moves one complete revolution plus 12 teeth.

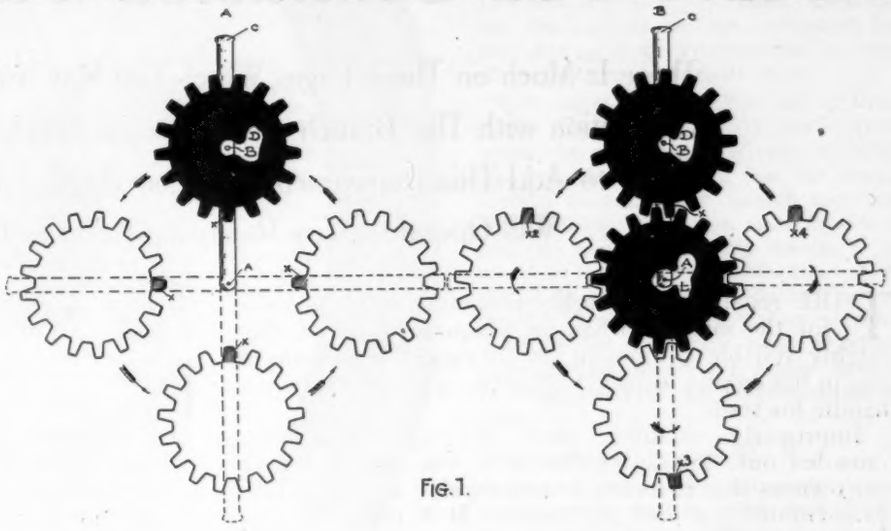


FIG. 1.

Reverse—In reverse position the clutch pedal is pressed just far enough to release the clutch, and the reverse pedal is pressed all the way down. This is illustrated in Fig. 3B. This contracts a brake band on the drum R (Fig. 2) holding the gear wheel R stationary. As the flywheel, carrying the triple gears, revolves, these planet gears must revolve on their own axis again, since one of the sun gears is held stationary by the action of the band on the drum R.

With reference to Fig. 3B, the number of teeth on the gears is as follows: Three has 24 teeth, two has 27 teeth (the same gear as in the low speed), R has 30 teeth and B has 27 (the same sun gear as for low speed which drives the transmission shaft through the drum B.)

The sun gear R is held stationary by the drum R and the gear three which is in mesh with it will have to roll around it, since it is attached to the flywheel, being one of the three triple gears.

Now in order for the gear three to make one complete revolution on its own axis, it must mesh with 24 teeth on gear R. (Fig. 1A and B). But gear R has 20 teeth, therefore, gear three does not make a complete revolution around gear R, but falls short by six teeth, bringing it to position Y, while going around one revolution on its own axis.

Gear two with 27 teeth is fastened to gear three and is in mesh with the driven sun gear B, and must make one revolution on its own axis as gear three does Therefore, gear B must mesh 27 teeth from positions O to Y, in other words, it must be **pushed back** 6 teeth in order to do so, this taking place slowly as gear two rolls around it. Thus, the transmission shaft is moved backwards 6 teeth while the flywheel makes less than one full revolution the correct way.

Summing up, the transmission of power from the crankshaft to the rear wheels at all times is as follows:

Neutral. Flywheel revolves carrying with it the three sets of triple gears and the internal driving set of clutch discs revolves, since the clutch is disengaged. The road wheels being stationary, hold the transmission shaft and the drum B and gear B stationary also, therefore, the drums and gears L and R revolve idly, since gear two rolls around stationary gear B.

Low speed. The drum and gear L are held stationary, therefore the power is from the flywheel, through the triple gears to sun gear B, drum B, shaft D to differential pinion to rear wheels, the clutch being disengaged.

Reverse speed. The drum and gear R are held stationary, therefore the power is from the flywheel through the triple gears to sun gear B, drum B, shaft D, to differential pinion to rear wheels, the clutch being disengaged.

High speed. The clutch is engaged and the power now goes direct from flywheel to clutch to drum B to differential pinion to road wheels.

It will be seen from the above that the power is at all times transmitted through the drum B, on which is placed the brake band.

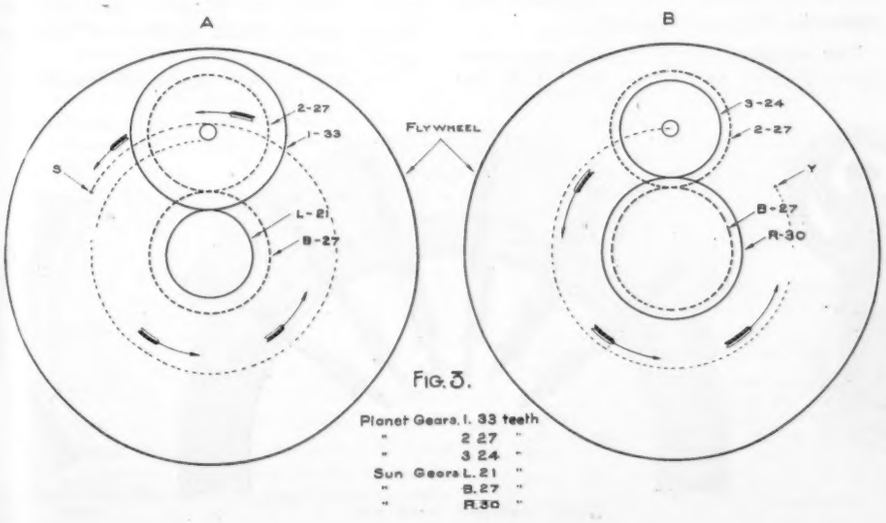


FIG. 3.

Planet Gears, 1. 33 teeth
" 2 27 "
" 3 24 "
Sun Gears L. 21 "
" B. 27 "
" R. 30 "

Have You Considered Tire Repairing?

There Is Much on These Pages Which You May Not Have Thought of in Connection with This Branch of Automotive Service. Many Dealers Are Going to Add This Department to Their Regular Business, and Others Will Operate a Tire Repairing Business Exclusively

TIRE repairing is a highly profitable business today for the man who has an adequate outfit of thoroughly reliable equipment, is an expert workman—or has in his employ expert workmen—and knows how to handle his trade.

Improperly qualified men are gradually being crowded out; guaranteed work is fast convincing the car owners that it means a considerable saving to them to patronize a skilled repairman. It is true that there are not enough competent workmen today to handle properly all of the tires which are in need of repairing.

IT IS not difficult to master tire repairing. Any man of average intelligence, and the ability to use a few simple tools, can become reasonably expert within two or three weeks' time, although it will take considerably longer for him to acquire confidence in his judgment and work up speed.

IT does require proper instruction and training to qualify a man to properly handle all types of tire trouble. While the vulcanizing of a repair is a comparatively simple process, it takes more than a little instruction pamphlet for a man to acquire the skill required for cutting down and rebuilding.

There was a time when, in order to learn the trade, a man must serve an apprenticeship in some shop. Instead of doing this, however, hundreds of men bought plants and endeavored to handle the work with no other knowledge than that gained from the small instruction book which accompanied the machine.

Schools for Tire Instruction

The result was considerable dissatisfaction among their customers, and a great many failures. This condition of affairs has been remedied, however. Many of the manufacturers of tire repair equipment, as well as the manufacturers of tires, maintain schools for training men in the repairing of tires, and a course in these schools will qualify him to properly handle the business.

There are close to 8,000,000 cars in operation. In all probability this number will be increased to 10,000,000 within the near future. This means 40,000,000 tires and tubes in actual use, most of which will require the services of a tire repairman some time during their life. There is only one possible way in which the car owner can get all of the mileage out of his tires which the manufacturer builds into them, and that is by taking them to a repair shop whenever they are injured.

The pneumatic tire of today has great strength and durability, but it is not damage-proof. The toughest tread ever made will sustain a cut when it strikes a sharp stone, switch point, or other object with a cutting edge. This tread cut, if neglected, will admit dirt, sand and gravel, which will grind away until a sand-boil is formed, and the final result is a blowout.

A good many men take care of minor repairs, such as tread cuts, themselves, but where the cut goes through into the fabric, plugging it merely aggravates the trouble.

Doubtless, if used over good roads only, and extreme care exercised at all times, the tread on the standard make of tires would always outlast the fabric.

Guarantee 3000 Miles More Service

There are numerous things which cause the tread to wear out or become loosened, while the carcass (fabric portion) of the tire, is still sound. In such cases an expert repairman can build on a new tread which he is willing to guarantee for 3,000 miles, at a cost very much less than that of a new tire.

Ten years ago tires with a bad blowout or rim-cut were considered as "done for." Today the expert repairman can easily restore such casings to life and usefulness.

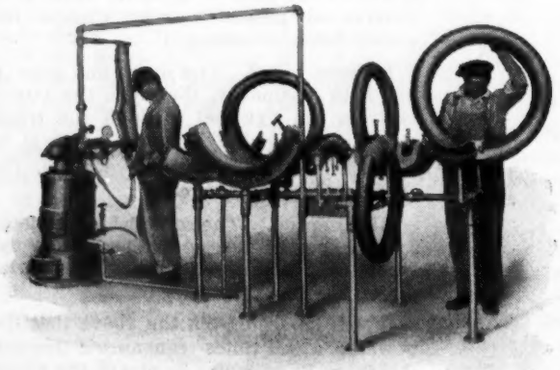
The first vulcanizing outfits placed on

MANY men have made money repairing tires, either as a separate business or in connection with their garage or service station.

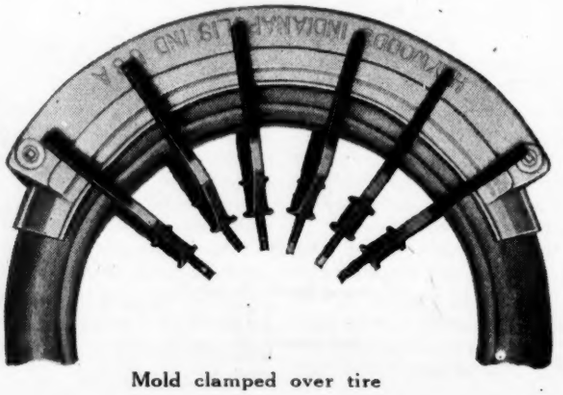
It is the purpose of this article to describe briefly the history, opportunities and equipment of this fast growing field.

Within the next year there will be close to 40,000,000 tires and tubes in actual use, and they will need repairing. Who is going to get this business?

MOTOR AGE is indebted to the Haywood Tire and Equipment Co., Indianapolis, for much of the data used here.

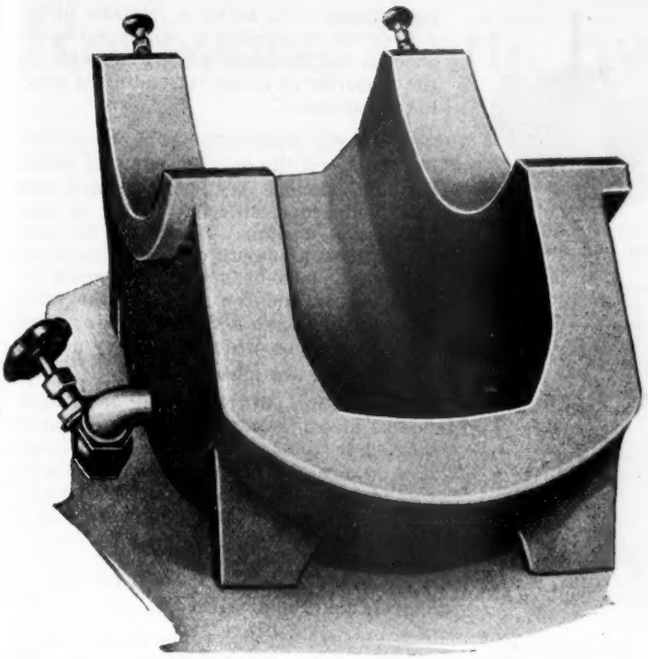


Typical layout of equipment



Mold clamped over tire

An inside cure mold



Truck tire mold, square tread

Section of tire cut down ready for repairing

the market were naturally somewhat crude, and the men who took up this work failed, in many instances, to realize that tire repairing was a science in itself and required expert knowledge. The result was that most shops never knew when they turned out a job whether or not it would give satisfaction. Today the man with a first-class tire repair plant and proper training is in a position to guarantee every job he undertakes to repair.

There are three methods of tire repairing in general use, "Air Bag," "Wrapped Tread," "Pad and Clamp." Each of these methods is adapted to the handling of some particular type of repair work, and the workman is considerably handicapped who endeavors to get along with a plant which compels him to confine himself to only one of these methods.

The Air Bag Method

The air bag method is used for handling sectional repairs. An air bag is placed in the interior of the casing and so inflated as to force the new rubber out against the heated walls of the mold. The outside of a complete new section in a tire, up to about 14 in. in length, covering both beads and the tread, can be vulcanized at one time in the air bag molds.

The wrapped tread system requires an inside curing mold, and furnishes an economical means of repairing small blowouts, which are built up by the inside process, leaving only a small spot on the tread to cure in an outside mold.

The pad and clamp system is used in retreading, in connection with a sand bag, because this enables the operator to secure the immense amount of pressure necessary to permanently unite the new tread to the carcass of the tire. Pads and clamps are also used in connection with special molds for the curing of sidewall jobs.

In selecting vulcanizing machinery, the man who expects to be able to handle all classes of work to the entire satisfaction of his customers, should select a plant which has at least a tube plate, an air bag and inside cure molds to accommodate all of the different sizes of tires. Since there are more 3½ and 4-in. tires in use than any other size, it is also a considerable advantage to have an extra 3½ and 4-in. mold. Sidewall and bead molds are not necessary, but they are a great convenience in handling this type of repair work.

It is very essential that all of these molds should have a good steam circulation, be sufficiently strong to withstand the pressure, and that the curing surface be absolutely smooth and free from defects. It is also most important that the steam generating devices to be used in connection with the molds should be constructed of first-class materials, equipped with safety devices, generate the necessary head of steam quickly, and supply an ample amount of steam for each and every mold at all times.

Arranging the Equipment

In placing the various machinery and equipment in the tire repair shop the big idea is to so arrange it that in taking a job through, the workmen will have to do as little walking around as possible. It is better to install the buffing machines in a separate room, because they produce a great deal of scrap and dirt, and make it hard to keep the shop looking neat and clean. Racks should be provided for both casings and tubes, the repaired goods being kept separate from those awaiting repairs. A large work table properly equipped with tire lasts and racks for the working tools should

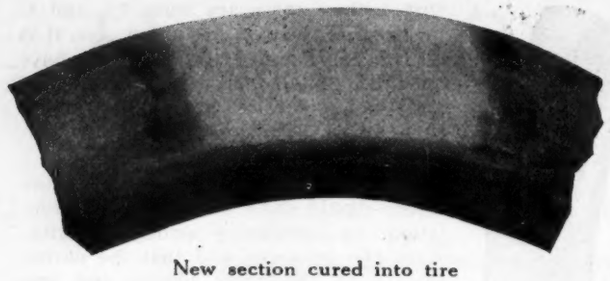
Equipment the Complete Tire Repair Shop Should Have

As an ideal shop outfit, complete in every detail, the following is suggested:

A tire repair plant, with air bag and inside cure molds for handling all sizes of tires, a tube plate, and retreading molds, with a separate heat unit for supplying steam.
1 two-hp. electric motor for operating air compressor, buffing stand, etc.
1 No. 4 air compressor, with tight and loose pulley.
1 50-gal. brased air tank.
1 10-gal. air tank with special fittings, for keeping air bags properly inflated while being used in the curing process.
50-ft. ¼-in. air hose.
1 buffing stand with tight and loose pulley.
1 8-in. wire buffing wheel with hub.
1 8-in. emery wheel.
1 tube puffing stand.
1 6 by ½ wire wheel for tube buffer.
1 6-in. emery wheel for tube buffer.

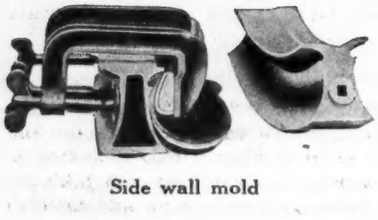
In addition, hand working tools are required, the number of each tool depending upon the number of workmen employed. Following are the hand tools commonly used in this work.

1 tread roller.
2 tire lasts (tire last should be provided for each workman who does any of the cutting down or building up).
1 garage jack.
1 rim tool.
(The number of pieces of equipment needed will, of course, always depend upon the volume of business.)
1 tire spreader.
2 12-in. hangers, 17-in. pulley, 1 10-in. pulley, 1 19-in. pulley, 2 set collars, 10-ft. line shafting.
Set of eight air bags.
Properly proportioned assortment of repair materials.
End cutting knife, used for splitting the old tread in tearing down the job.
Notched end fabric knife, permitting of the cutting of just one ply of the fabric at a time.
Side cutting knife used in trimming down the repair.
Tread chisel, used in separating the tread from the carcass.
Rasp, or coarse grained file, used in roughening the edges of the repair.
Scraper for cleaning up the carcass of the tire.
Extra heavy pair of curved handled shears for cutting fabric from the roll, also smaller pair of shears.
Flexible steel rule for measuring the repair of the casing and a tri-square used in properly laying off the stock.
Stitcher used in applying the different layers of fabric.
Hand roller used in applying rubber stock.
Tube splicing mandrels for inserting of sections in inner tubes.

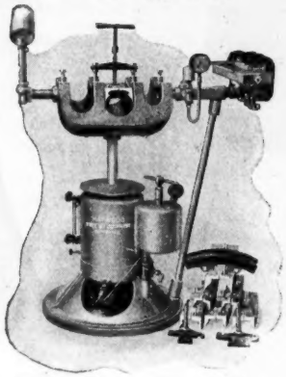


New section cured into tire

Air bag mold



Side wall mold



Double cavity mold

be provided, with the vulcanizing machines close by.

The man who does not intend to handle retreading will not need a plant with retreading molds, or he may prefer to use a separate plant for retreading. The plants vary in size and capacity, from the tube plant, which handles tubes only, up to the size 14, which has thirteen molds for handling every injury on every type and size of tire, including molds for producing both plain and ribbed treads.

There are smaller and lower priced plants with kerosene burners which do not handle the larger sizes of tires. They are especially intended for the man who wants to take up tire repairing only in a small way, and grow into something bigger; also for the man who wants to install tire repairing as a department of his business.

Retreading plants come in two styles, plants with only one mold with steam generator, or those with two molds for handling 3, 3½, 4, 4½ and 5-in. tires, with vertical steam generator.

As to whether or not it is advisable for a man to undertake retreading, this is a question that he must decide for himself, after an investigation of local conditions. More and more of the car owners are becoming convinced that retreading does pay, and with modern materials, methods and machinery, the repairman can turn out work which will give satisfaction—provided care is exercised in selecting the tires for retreading. Some men make a mistake in endeavoring to retread a casing after the carcass has become badly weakened. In the majority of cases retreading is proving profitable.

There are numerous types of retreading molds on the market, some of which, through the use of matrices, will produce numerous different styles of nonskid tread designs. Some are die cast, which gives a smooth curing surface, and insures a perfect contact between the new rubber and the walls of the mold. These molds have a clamping flange cast on each side, on which the heavy double-grip clamps are seated.

In addition to the equipment mentioned above, every tire service station located in the larger cities, or in localities where there are numerous trucks, should consider the installation of molds for the repair of the pneumatic truck tires.

The Truck Pneumatics

There are at this time, about 750,000 trucks in the United States, and 1919 showed a gain in production over 1918 of 39 per cent. Not all of these trucks use pneumatic tires—the heaviest ones probably never will—but the pneumatics are constantly growing in favor. The arguments in favor are that they greatly lessen road shocks, save on repair expense, prolong truck life, reduce slipping, permit greater speed, and give increased gasoline mileage.

In every section where there are a goodly number of pneumatic tired trucks in operation it will pay the repairman to install the necessary equipment for handling them. The original cost of these tires is so great that it becomes a necessity to properly care for them and secure just as great a milage as possible.

How to Avoid Delay in Getting Parts From the Factory

The Vim Motor Truck Co. Emphasizes to Its Dealers the Neccssity of Following This Instruction When Ordering Parts

THERE are times when dealers, even those carrying a large stock of parts, will have a job on hand in the shop for which a part, such as a cylinder block, axle housing, etc., may be needed, and which they do not have in stock.

In such an event, a man's first impulse is to get a wire right off to the factory, ordering the required part to be rushed forward. The order is made out hurriedly, and frequently very little consideration is given to the matter of furnishing the information necessary to fill the order correctly.

He will probably consult the parts book and order according to the part number, but he will neglect to make sure that the part number applies to the type part needed. Or, worse still, he may not even consult the parts book, but will merely describe the part needed, with the result that it is not understood just what it is he wants.

Now perhaps there is nothing more exasperating than to have a job held up in the shop awaiting parts, only to find when the ordered parts arrive that they are not the ones required.

If, however, a dealer will observe the following suggestions when ordering parts, much of this trouble and misunderstanding will be eliminated.

ALWAYS refer to the section of the parts list covering the type car or truck for which the parts are needed. Locate the part number, and then make up the code words covering same, as described in the parts list. This will furnish the maker with direct information concerning the parts needed, and will also reduce the number of words in the telegram!

Also, when parts are ordered for a particular job, be sure to furnish the chassis number. This information is essential where a change has been made affecting the size or interchangeability of the various parts.

If these simple directions are followed, there should be no difficulty in getting orders filled promptly and accurately. It is true that the shortage in the material market is still quite acute. For this reason, there may be times when the stock of certain parts may be entirely exhausted. An improvement in the market is noted, so that in a very short time there should be no shortage or delay in the procuring of parts.

The factory wants to render you efficient, prompt service, and earnestly solicits your co-operation.

Renewing Parts by Electro-Deposition

This Is a Lesson from the Practice of the British Army Overhaul Shop That Should Be Valuable to the Entire Industry. The Building Up of Such Parts as Stub Axles and Ball Race Housings Was Accomplished Quickly and Efficiently, Making Possible Further Service in War Activities

THE repair shops of the British army during the war greatly felt the need for some form of "putting on" tool. Such parts as stub axles, ball race housings and many others, when worn down must either be built up in some way, allowed to continue slack or be scrapped. The process of electro-deposition was resorted to and it was found possible to deposit a layer of iron up to about 2 mm. (5/64 in.) in actual thickness on any simple cylindrical surface of wrought iron or steel, mild or cast.

IF properly done, this layer is firmly adherent, and it is practically impossible to chip it away from the base metal with hammer and chisel. It is deposited direct on the surface without "coppering" first, and can be subjected to red heat without apparent deterioration. It can be carbonized and hardened in the ordinary way, and thus treated, under favorable conditions, appears to associate itself so closely with the base materrial that the dividing line shown in microphotos of the untreated deposit passes away.

By B. H. THOMAS.

THE layer presents an extremely smooth surface, and the thickness put on in a given time can be predicted with considerable accuracy. It can be filed or ground and takes a high finish. Its wearing qualities on a fast-running journal are, as far as the author knows, untried, but it is perfectly satisfactory on such parts as brake and clutch shaft ends, starting handle spindles, etc., which wear considerably in their brackets, and there is no obvious reason why it should not be satisfactory for building up worn journals.

Limited in Some Respects

The chief limitation of the process seems to be the inability to deposit satisfactorily on such materials as cast iron or aluminum. It is quite possible to deposit copper on aluminum parts, but such deposits are not permanently adherent. This is unfortunate, as, if it were possible to deposit an adherent coating of iron on such parts as worn gearbox ball race housings, etc., the scope and usefulness of the process would be greatly increased.

The practice of putting on a copper deposit was not thought worth while, as the same end was achieved more easily by simply coppering the outside of ball races where necessary. This, of course, had the obvious disadvantage of rendering such parts non-standard. At the same time, however, it was in many cases the only way of saving a valuable part, and infinitely preferable to tinning or knurling up. Quite possibly, further research would produce the desired result.

Types of Work Built Up

From the autumn of 1917 to the spring of 1919 over 6000 parts were reclaimed. It is not necessary to enumerate all, but the following are typical:

Stub axle arms—Two bands of deposit put on to bring the arms up to a tight fit in the ball races.

Steering swivel pins, brake and clutch shaft ends where worn in the brackets.

Change speed lever shafts where worn on the sliding shaft.

Starting handle spindles.

Insides of wheel hubs, where the housings have worn slack on the ball races.

Various shafts on which ball races are required to fit, including magneto armature ends.

Outside of axle tubes which wear in the saddle brackets.

Universal joint pins which wear loose in their housings.

In very many cases the car came back to the shops after a period of use sufficient to make a complete overhaul again necessary, and it was possible to examine the behavior of the deposits under severe conditions. Such examinations have confirmed the view that the deposited parts should stand up perfectly satisfactorily in service.

Details of Depositing Bench

The essential parts are as follows:

Double pole switch, 4 way, giving 2, 4, 8, 12 volts.

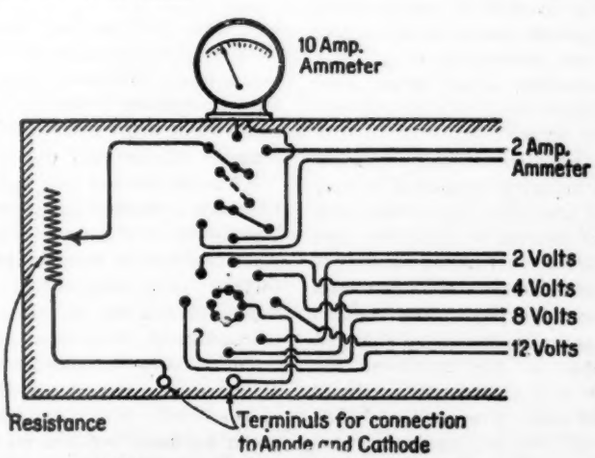


Diagram of electrical connections

Double pole switch, 3 way, giving (a) direct to bath; (b) through 10 amp. ammeter; (c) through 2 amp. ammeter.

Resistance, adjustable.

Clock face for recording the times of putting on and taking off the work.

Ammeter.

Cross shaft carrying rocker arms with anodes.

Adjustable holder for the work.

Depositing vat (wood, pitch lined).

Terminals for connection to the bath.

The cross shaft receives its motion through an eccentric driven by means of a ¼ hp. electric motor with reduction gear, fitted under the bench.

Fig. 1 shows the essentials and the internal connections diagrammatically.

Bath Composition

The composition of the bath making up the deposition solution which yielded the best results was made up of Ferrous Ammonium Sulphate at a strength of 75 grams per liter of water, with a current density of 30 sq. cm. per .1 amp. It was found essential to provide means for keeping the shop at a reasonably even temperature, as otherwise in cold weather the deposits became brittle and badly adherent. Eventually, therefore, steam heat was installed and kept going night and day when necessary.

The efficient cleaning of the work is naturally of the highest importance, and is, indeed, almost the crux of the whole process. Where a portion of the surface is to remain unaltered, it is, of course, necessary to stop off such parts with wax or other composition.

Deposition

The general method of operation was to suspend the work in a vertical position in the vat, carrying it by means of standards fixed to the bench provided with universally jointed arms fitted with clamps at the end to hold

(Concluded on page 53)

EDITORIAL

CONSTRUCTIVE ADVERTISING AND OUR INDUSTRY

THERE exists a sharp line between the two classes of advertising, good and bad—not bad in the sense of proving of no value to the advertiser though it often acts as a boomerang in this respect, but bad in the sense of awakening a feeling of distrust in the buying public and, as a result, menacing the industry as a whole.

All advertising is not in the columns where charges are made at so much an agate line. A good deal of it is on the first pages of newspapers and in the editorial text of other publications. Every factory executive, or distributor, or mechanic is an advertiser for his industry when he is quoted in any publication or when he speaks to an audience. Whoever listens to him is gaining an impression of the industry.

In the automotive industry at this time when unusual conditions are being experienced there are evidences of a return to the ancient custom, which happily has long been dormant, of decrying a competitor in efforts to further the individual business of the advertiser. It must be remembered that the two primary fundamentals of advertising, if the advertiser is to profit by his efforts and expenditure, are to increase sales and to lessen their cost. These objects cannot be achieved if a mud-slinging campaign is in progress with manufacturer, distributor or dealer of cars, trucks or parts indulging in loose statements on what his competitor has done.

The industry that keeps its house in order, that does not give way to pitched battles in public, that talks well of itself and leaves the impression with the public that it is a happy family, is the best advertised. There is a big difference between best advertised and most advertised; it is the impression that counts.

If one manufacturer advertises that the price of motor cars has risen at such and such a rate while the percentage of rise of his own make has been very much below this figure and another manufacturer makes the same assertion concerning himself but with different figures as the high level they are very apt to find their two statements published side by side in the medium of publication with the obvious deduction drawn by the public that one or the other or both are not stating the facts. But even if either of these men was stating a fact what good would it do? Why not prove to be right on that ground alone and not because the other fellow is wrong?

Public May Misconstrue Facts

Statements like these open the wedge for a family quarrel in the automotive industry and no industry, whatever it may be, can afford to have such tactics adopted. Advertisements of this character serve to arouse the distrust of the public and for that very reason defeat their aim of increasing sales.

Cars are not comparable in the sense that is implied in such statements as put forth by these two advertisers. No explanation is given that the competitor has in the meantime changed from imitation to real leather, that he has improved his engine, that he is painting his body with eleven coats instead of six or of the other things that he may have done and that the advertiser has not changed at all but is standing pat on the 1914 output.

What the attitude of every advertiser should be is that—I am a part of the industry and I can succeed only as the industry succeeds. The only thing that is as important as my product is the industry. I will advertise my product and the industry and leave the other fellows to take care of themselves.

It is risky to start anything that cannot be finished, to start talking facts without telling all the facts; the other advertiser may spring a surprise and tell the facts as they are and if his advertisement is in the column next to yours you are making trouble for yourself. The prospect may believe the other fellow; at least he may question you.

At any rate the industry suffers.

TIME FOR OVERHAULING

THE harvest nearly over, the agriculturist, as Governor Cox calls the farmer, is apt to push his tractor in the barn and leave it there until spring, unless there remain a few stumps yet to remove, in which event the working days of the year for the tractor will be prolonged a few more hours. The big thought is that the farm implement machinery is ready for the winter season. Before the machinery is again called upon it is a wise farmer that considers an overhauling as essential. Does this not represent a potential business to the tractor dealer? Might not the farmers of your territory be circularized with that point in mind?

Of couse, we are not all within the winter season boundaries. Some dealers have year 'round climate and to these, the same business might as easily fall due.

BUSINESS LOOKS GOOD

THE country is coming back to a peace-time basis rather faster than it had anticipated. For a long time the cry of manufacturers has been that the unit output of man has been greatly diminished and that the individual spirit of push had lost favor to organized labor's cry of "More pay, less time." Now we find manufacturers stating the output per man is increasing. Evidently the men are awakening to the fact that individual progress is more determined by individual effort than mass effort directed through the office of a labor leader. At any rate calamity is not foreboded by the signs.

With production per man going up in all the large manufacturing centers prices may be expected to come down and stay down. We have all read many statements that the recent price reductions were taken not without a loss by the manufacturer, and from this it augurs that unless conditions do adjust themselves within a very short space of time a retrocession of price must take place.

The greatly increased business that has resulted since the prices were reduced are the straws that show the direction of the wind. Many of them have again been forced to turn down business because no cars were available.

On the whole we should say that business looks bright.

Car Business in California Halted by Price Reductions

Everything Was Going Along Smoothly in Trade When Ford Made His Announcement

SACRAMENTO, Calif., Oct. 8—With the announcement of the decrease in price of some cars the automobile business in California has practically stopped. People simply are not buying until the matter of prices becomes settled and they are assured they will not waste money in purchasing.

The situation appears a bit different out here on the coast than in the East or Middle West. Here there seems no reason for any price reductions. Everyone was going ahead happily, bankers had released their hold on money and automobile paper was being turned. No one was complaining about prices, the only complaint was that there were no cars.

Then, out of a clear sky, came Ford's announcement of a drop, and the bottom fell out of the market. Fords are selling but not rapidly and other cars are simply held awaiting the factory announcements that will set speculation at rest.

There are no dealers on the Pacific coast now who may be said to be overstocked with cars. Most of them have not been able to get enough cars, owing to the freight-car shortage. Consequently, they have not been hard hit by the drops, but they will be if an announcement does not clear up the entire atmosphere within two or three weeks.

TIRE DEALERS ORGANIZE

Chicago, Oct. 11—The Chicago Tire Dealers Association has been formed here with a present membership of 75. While the association at the present time includes only dealers in Chicago it is very likely that the membership later on will embrace men in the trade doing business in the vicinity of the city. It is proposed to hold meetings every two weeks. The officers of the association are: F. Zeman, president; Thomas Whitehead, vice-president; Adolph Schmitz, treasurer and F. G. Erkert, secretary.

COMMERCE MOTORS IN OPERATION

Detroit, Oct. 8—Commerce Motor Car Corp., after a two months shut down resumed operations last Friday when it was announced that the company in the future would devote its efforts to building a high speed economy truck. The job will be known as Model G and will be equipped with pneumatic tires, with a speed rating between thirty-eight and forty miles an hour. The truck will be built to carry from 1500 to 2250 lbs., and announcement of its appearance already has resulted in many advance orders, according to C. D. Wilcox, general sales manager.

The new Commerce truck is equipped with 3¾ by 5 in. Continental motor, Salisbury rear axles, Spicer universal joints and Detroit transmission. The clutch is a cone type 14 in. in diameter. The wheels are wood artillery equipped with 34 by 4½ Goodyear non-skid pneumatic cord tires on both front and rear wheels. Among the other units are Detroit Steel Product Co. springs, Jacox steering gear, Zenith carbureter and Stewart vacuum feed. The cooling system is thermosyphon with a cast tank radiator. The car will be known as the Mercantile Express model and will sell for $1350 in chassis form. It is expected that a large part of the Commerce factory will be turned over to producing this model in quantities.

NO SUCCESSOR TO PIKE YET

Detroit, Oct. 5—General Sales Manager Henry Krohn, of Paige Motor Car Co. is handling both truck and passenger sales pending the appointment of a successor to C. S. Pike, vice president in charge of truck sales, who left the company two weeks ago. At the time of his resignation Mr. Pike announced that he had no immediate future plans, but it is understood another Detroit truck concern is negotiating with him and announcement of his appointment is expected shortly.

Program for Bethlehem Motors Co. to Nov. 1 Is Approved

New York, Oct. 8—The tentative program of the receiver of the Bethlehem Motors Corp. for activities up to Nov. 1 has been approved by both the bank and merchandise creditors' committees. No action has been taken concerning operation of the plant beyond that date. The bankers, whose claims aggregate $1,700,000, do not seem inclined to invest any more money in the company. Whether its affairs will be liquidated after Nov. 1 will depend upon the determination of the stockholders in regard to a protective committee.

Outline of Production

The receiver's program calls for the completion between Sept. 17 and Oct. 31 of 228 trucks. There are now in stock 206 completed vehicles. Sales requirements for this period are estimated at 323. Export orders booked will take 86 trucks, of which 20 will go to Manila, 18 to Delhi, India; 12 to Barcelona, Spain, and 9 to Pernambuco, Brazil. Foreign orders expected total 120, of which 43 would go to Havana. Sixty-seven orders have been received since the receivership became effective.

The number of employes in the Allentown plants has been steadily reduced since the receiver took charge. It was cut on Sept. 28 in the two plants from a total of 968 to 550. The process of reducing overhead will be continued and it is estimated that the week of Oct. 11 there will be only 350 workers in the Allentown plant and 50 in the one at Pottstown.

Start Campaign to Keep Roads In Middle West Free from Snow

Producer and Consumer Likely to Suffer If Remedial Measures Are Not Taken

CLEVELAND, Oct. 8—The first of a series of meetings that will be continued in the Middle Western states until every highway department and local road official will be prepared to ditch promptly any snowfall that interferes with main motor traffic has been held here under the auspices of the National Automobile Chamber of Commerce. J. L. Harrison, senior highway engineer of the Federal Bureau of Roads, and K. A. Moore, of Detroit, assistant traffic manager of the national chamber, were in attendance at the gathering which brought together traffic officials from all automobile manufacturing plants in the city.

Speaking of necessity for the campaign, Mr. Moore explained that with the motor truck performing such a necessary service in short haul freight transportation it must be given the same continuity in service as production generally possesses. He pointed out that the railroads already are crowded to capacity with freight and that should there be another severe winter in the Middle West, and the main highways not kept open, disastrous results to the producer and consumer would follow. Millions of tons of short haul freight are transported over Ohio highways monthly while hundreds of thousands of cars are driven away from factories. The welfare of both producer and consumer demands that there be no interruption of that service, said Moore. Figures were produced to show that in the Middle West are made 90 per cent of all commercial and passenger cars used in America.

Name Receiver for Van Briggle Following Loss of Patent Suit

Indianapolis, Ind., Oct. 11—The Van Briggle Motor Device Co., manufacturers of shock absorbers for Ford automobiles and carbureters, has been thrown into receivership on petition of eighteen stockholders of the company, including Frank Hilgemeier, vice-president, and several members of the Board of Directors. L. Howard Van Briggle, president and founder of the company, is charged with mismanagement. The suit was filed in the Marion Circuit Court and Judge Harry Chamberlain appointed William R. Hirst receiver with authority to continue the operation of the plant.

The complaint states that following the granting of an injunction against the Van Briggle Motor Device in Federal court in July, on petition of the Robert H. Hassler, Inc., forbidding it to manufacture absorbers on the ground that it was an infringement of the Hassler patent, the defendant company practically ceased to manufacture absorbers, the earning of income ceased and the company is now heavily in debt.

Ford Price Cut Tending to Lower Steel Costs

Reductions Not Demanded But Material and Parts Makers Show Desire to Lower

DETROIT, Oct. 9—While the effect of the Ford price reduction already is being felt in reductions in the parts and material field, the real significance of the Ford influence is not discernible to those not conversant with Ford's personal efforts to stimulate the movement throughout the industry.

An official of the Ford Motor Co. said today the company had not demanded reduced prices on steel and other materials and parts but had suggested to all sources of supply, the "economic advisability of fostering and furthering the movement and had been gratified by the wholehearted response," not one of the concerns approached failing to cut promptly to the extent of its ability.

F. M. Diehl, purchasing agent of the company, when asked regarding the attitude of the concerns who responded, declined to name the companies or specify the particular material or units on which the reductions were quoted. Mr. Diehl admitted, however, that the suggestion and the responses in some instances, notably steel, covered contracts which have been in force some time.

From another official of the company it was learned the Central Steel, American Steel & Wire Co., and the Carnegie Steel Co., the two latter subsidiaries of the United States Steel Corp., through representatives, had been in conference with Ford officials relative to the price cut. This same official said while the reductions were not as large as the cut on Ford products it was sufficient to satisfy Ford officials that material men and parts makers were very willing to join Ford in his announced effort to stabilize industrial conditions.

CASE GUARANTEES PRICE

Racine, Wis., Oct. 8—The J. I. Case Threshing Machine Co. says: "The Ford cut cannot affect our policy. In view of the continued high costs we cannot lower the price and maintain quality and we are guaranteeing against any reduction until July 1."

DIAMOND-T REDUCES

Chicago, Oct. 8—The Diamond-T Motor Car Co. has announced the following reductions on its entire line of motor trucks: 1½ ton from $2800 to $2450; 1½ ton with farm body, $3100 to $2715; 2 ton, $3485 to $2835; 3½ ton, $4825 to $3925; 5 ton, $5675 to $4615; 5 ton special, $5900 to $4800.

KING MEETS REDUCTIONS

Detroit, Oct. 8—King Motor Car Co. announces it will "meet the prevailing price reductions by cutting $110 on open models and $200 on closed jobs and protect all dealers on cars in stock purchased after July 1." The reduction is made on a basis of lower production cost by reason of the company's removal to a new plant, according to the statement, rather than representing the true value of the car which, it is declared, "already is underpriced."

Chevrolet, Lincoln and Scripps-Booth announce they will not reduce prices. The Barley Motor Car Co. of Kalamazoo, which increased its price $100 on the touring car, the sport model and the seven passenger car states that the price of the Roamer-Duesenberg remains unchanged. The increase is on models equipped with Continental engines.

In the event of a decrease before May 1 Chevrolet announces it will refund the amount to every person who purchases a car between Oct. 1 and May 1. That attitude is said to represent all units of General Motors Corp.

New Insurance Schedules to Follow Drop in Car Prices

Hartford, Conn., Oct. 8—Insurance interests here have notified all agencies to submit to the home office all details concerning the placing of insurance on cars, this action having been taken within the past week following the announcement of price reductions of various makes of cars. In other words, the home office to preclude the possibility of over-insurance, insists on the full facts before the insurance will be issued. A new schedule of valuations has been drawn up to cover the situation.

NEW PRICES OF FEDERAL

Detroit, Mich., Oct. 8—Reduction in the prices of the Federal motor trucks has been made by the Federal Motor Truck Co. The new prices are as follows: 1 ton, $2500; 1½ ton, $2725; 2 ton, $3025; 3½ ton, $3950; 5 ton, $4600.

INDIANA TRUCKS LOWER

Marion, Ind., Oct. 8—The Indiana Truck Corp. has reduced the prices of its motor trucks as follows: 1¼ ton from $2425 to $2290; 2 ton, $3140 to $2950; 2½ ton, $3350 to $3150; 3½ ton, $4150 to $3750; 5 ton, $5075 to $4775.

COLE PRICES MAY ADVANCE

Indianapolis, Oct. 8—The Cole Motor Car Co. states that there will be no reduction in Cole prices.

"In 1918," says the announcement, "this company adopted a policy of constantly manufacturing a finer motor car, adding thereto from time to time such improvements and refinements as have proven to be of value to our owners.

"It is absolutely contrary to our basic program to let any condition interfere with this purpose to build a car that at all times represents the highest value which it is possible for us to afford for the price it bears.

"Furthermore, it is not the intention of this company to let anything stand in the way of development of our product, and we will not hesitate to advance the price of our car if by so doing we are able to add to its efficiency."

New Ford Car Designed— No Plans Yet For Production

Mystery Shrouds Reports of New Model—Could Be Ready in Three Months

DETROIT, Oct. 9—So many reports have been published regarding the new Ford car, each report bringing denials and evasions, that the mystery regarding the car has become almost impenetrable. No information is obtainable from Ford officials regarding the new car and in fact it is denied by those close to Mr. Ford that a new car is planned.

An official of the company admitted today, however, that a new car had been designed and could be put on the market if such course was deemed advisable. He qualified his statement, however, by declaring "no conclusion had been reached regarding the bringing out of the car and if such decision was made it would require a year to get into production." Others contend the car could be put on the market in three months.

From unofficial but reliable sources it is learned the body of the new car will be streamline and will be 14 in. longer than the present model. The engine is declared to be six cylinder with improvements that minimize vibration.

The best alibi offered by Ford officials when questioned regarding the new car is "why should we bring out a new car when we cannot make the present model fast enough to supply the demand?" They admit, however, that with Ford facilities and Ford system a new car could be produced if occasion demanded and that in comparatively short time.

WESTCOTT PRICES CHANGE

Springfield, Ohio, Oct. 8—Effective Oct. 1 prices of all Westcott cars, both Larger Six and Lighter Six models, were reduced in price, the cuts ranging from $200 to $500. Prices of open Lighter Six models were reduced $400; closed Lighter Six, $500; all Larger Six, open and closed, $200. The reductions are as follows: Lighter Six touring from $2690 to $2290; Lighter Six roadster, $2690 to $2290; Lighter Six sedan, $3890 to $3390; Larger Six touring, $3190 to $2990; Larger Six sedan, $4790 to $4590; Larger Six limousine-sedan, $4890 to $4690.

SUPPLY HOUSE REDUCES

Chicago, Oct. 8—The Times Square Auto Supply Co., with branches throughout the country, announces a 20 per cent reduction in all supplies with the exception of a few articles on which the manufacturers make a restricted resale price.

DENBY PROTECTS AGAINST CUT

Denby Truck Co., in a letter to distributors, announces there will be no change in price before January 1, the company guaranteeing to protect distributors and buyers against a reduction prior to that date.

Production For September Falls Off in Cars and Trucks

Some Makers Cutting Schedules So As to Keep the Output Close to Ready Demand

DETROIT, Oct. 9—Production in the Detroit district took another decided slump in September, both in passenger cars and trucks, and a still further decrease in October is expected. The demand, already curtailed by reason of the financial crisis, was given a blow with the Ford price cut and the bewildered state of the public mind presages a still longer period of waiting on the part of buyers, who naturally are wondering if the bottom has been reached.

Passenger car production in September was 139,290 as against 150,313 in August, a falling off of 11,023. This, however, does not reveal the real condition because of the fact that Ford's production in September was 5,083 greater than in August. Eliminating Ford, the production decrease was 16,106 out of the total of approximately 10 per cent. July and August production was about 35 per cent below normal, the figures making the September output about 45 per cent below the schedules outlined at the beginning of the year.

There were only 14,369 trucks manufactured in thirty-two plants included in Detroit and Michigan territory, of which total Ford produced approximately 10,000.

E. A. Nelson Motor Car Co. and Maxwell-Chalmers plants still are out of production, though some cars were finished in the latter plants in September on chassis built before the plants were shut down pending reorganization. Lincoln Motor Co. is just swinging into production on the new car and the same is true of the new Packard single six. Buick production took a jump in September, the apparent fall in Buick production in August being due to the change from the old to the new model.

Cadillac, Hupp and Reo moved along at about normal schedules, but in the majority of the other plants the decrease was heavy, ranging from 15 to 40 per cent over figures for August. Hudson-Essex production dwindled steadily throughout the month, the decrease in output in those plants reflecting the company's determination to conform insofar as possible to the suggestion of officials of the Automobile Dealers' Association and the N. A. C. C. to confine production to demand.

ALL SELDEN MODELS REDUCED

Rochester, Oct. 8—A reduction in price of all models was put into effect here to-day by the Selden Motor Co. The reductions range from $100 to $170 on the various models. The 1½ ton truck has been reduced from $2460 to $2360; 2½ ton, $3550 to $3425; 3½ ton, $4325 to $4175; 5 ton, $5770 to $5660.

Commenting on the reduction, G. C. Gordon, president of the company, said: "The present cost of materials and labor does not, from an economic point of view, justify reduction in prices. However, the present temper of the buying public demands lower prices, regardless of what sacrifice the manufacturers are obliged to make during this period of readjustment. Accepting with the spirit of co-operation this nation-wide demand we have made this reduction although to do so means a sacrifice on our part."

These Cars Have Reduced in Price

Bell, Bour-Davis, Chalmers, Chandler, Cleveland, Crow-Elkhart, Essex, Ford, Franklin, Gardner, Hudson, Jordan, King, Liberty, Locomobile, Maibohm, Maxwell, Mercer, Moon, Overland, Paige, Selden, Studebaker, Westcot, Willys-Knight, Velie, Columbia.

These Trucks Have Reduced

Bour-Davis, Diamond, Federal, Indiana, Patriot, Standard, Stewart.

These Cars Have Increased

Haynes, Lexington, Pierce-Arrow, Roamer.

TEMPLAR MAINTAINS PRICE

Cleveland, Oct. 9—The Templar Motors Co. has announced that there will be no reduction in the price of the Templar motor car.

"Templar motor car prices," says Harry W. Anderson, general sales manager of the company, "will not be reduced now and we can give no assurance that they will be in the future. They are based on true values and will be maintained on that basis."

LIBERTY ANNOUNCES CUT

Detriot, Oct. 8—Liberty Motor Car Co. today announced price reductions on all models effective immediately. The touring car and runabout, which have been selling at $1,985, have been reduced to $1,795. There is but slight reduction in closed models and the four-passenger speedster, the latter quoted now at $1,885, the coupe at $2,825, and the sedan at $2,850.

STANDARD TRUCK REDUCES

Standard Motor Truck Co. also announced price reductions on its four models, the statement containing the announcement that the company does not wish to appear a philanthropist but simply desires to assist in the country-wide movement to reduce prices. The new prices follow: One ton model $2,250, reduced from $2,475; two and one-half ton $3,100, reduced from $3,520; three and one-half ton $4,000, reduced from $4,410, and five ton $4,800, reduced from $5,250.

Keen Competition for Space at New York and Chicago Shows

Eagerness and Ready-to-Go Spirit in Evidence at Drawing Held By N. A. C. C.

NEW YORK, Oct. 8—The space drawing for the New York and Chicago shows was held this afternoon in the recently opened and spacious headquarters of the National Automobile Chamber of Commerce. There was not a note of pessimism, not a suggestion of the recent difficulties that have beset all industry.

Instead there was an eagerness and competition and a ready-to-go spirit, not unlike that just before the whistle blows in a big game. Friendly competitors to the number of a hundred, manufacturers whose names are household words in the trade, scanned the space diagrams and selected the most strategic points for the big shows, which are confidently expected to be the opening move in an era of big business. For New York 87 drew; for Chicago, 80.

Buick Picks the Big Space

Buick drew first, and picked the big space, with 1171 sq. ft. directly in front of the main entrance and at the right of the broad central aisle. Dodge, the next to choose, took the similar space at the left of the main aisle, directly in front of the main entrance. Then came Overland, Chevrolet and Studebaker in the order named, each taking spaces directly back of Buick and Dodge. There are thirty-two spaces on the main floor of Grand Central Palace. Both the main and second floors are devoted to cars, and, as is usual, part of the third floor is laid out for cars too. But so great were the demands for space that Rauch & Lang, Friend and Piedmont took spaces 10½ x 12 ft. on the top floor among the accessories.

For the Chicago show, Buick picked the space it has had for several years, in almost the center of the Coliseum. Dodge, Overland and Studebaker picked similar central corners, and many of the early drawers selected spaces where they have shown for several years past.

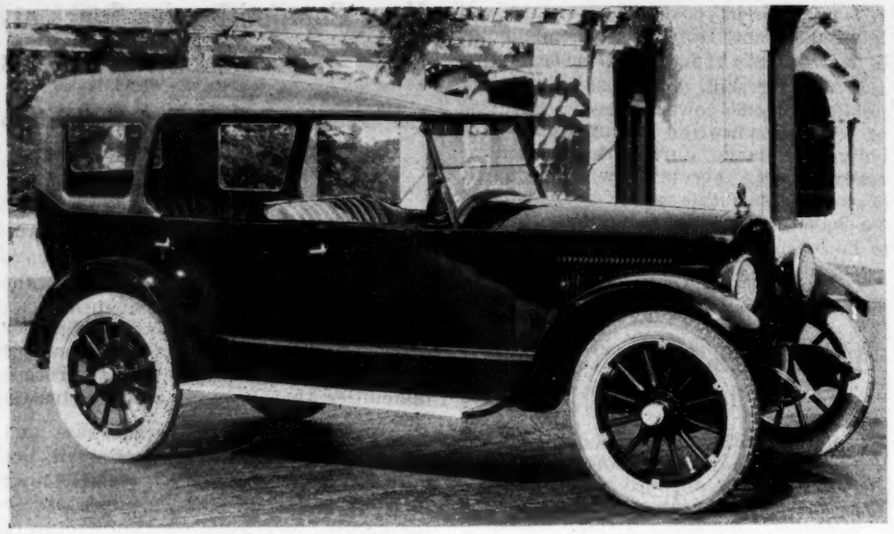
Chicago Has Less Room

There was less available space at Chicago than New York, and a number of non-members have yet to be taken care of. Mercer and Locomobile, now in Hare's Motors, are near neigbors in both shows, as are Maxwell and Chalmers.

COLUMBIA LOWERS PRICE

Detroit, Oct. 11—The Columbia Motor Car Co. has announced a cut of $200 on its touring car and $100 on all other models effective today. The prices now are: Touring car, $1795; sport, $1945; roadster, $1945; sedan, $2895, and coupe, $2895.

Newton, Mass., Oct. 11—The Stanley Motor Car Co. has announced new prices of the Stanley steamer as follows: Touring, $3950; coupe, $5650; sedan, $5775.



The Beggs Six, a Western Product

This is a well planned car, assembled and constructed from standard units, known and accepted by the trade. The car has a straight line appearance which is characteristic of the latest design. The bodies are mounted on 120 in. wheelbase chassis. Among the units of this car is the power plant, the Continental 7-R engine. This engine has a bore and stroke of 3¼ by 4½ in., giving it an N. A. C. C. rated hp. of 25 plus 35. This engine has been repeatedly described in our columns and its features are no doubt familiar to our readers. The clutch is a Borg & Beck dry disk, and the gear set of Detroit make. Arvac universal joints are used, which carry the power to the Stan Par rear axle. A Ditweler steering gear is used. The electrical system includes an Auto-lite generator, an Auto-lite starting motor, Connecticut ignition with 100 ampere Exide battery. The voltage of the system is 6. Goodrich tires of 33 by 4 in. dimensions are standard equipment. The car lists at $2,150. In connection with the bodies, heavy Spanish leather upholstering is employed

United Effort Is Needed to Get Sales Down to Cash Basis

With Automobile Paper Good on Coast California Dealers Find Contract Terms Satisfactory

SACRAMENTO, Calif., Oct. 8—Motor car dealers of Sacramento and northern California are much divided in their opinions as to the value of cash sales. Some of the dealers have been trying, but vainly so far, to get their business on a cash basis.

"It's part of the business, this selling on contract," says Jack Flynn, of Mecum, Flynn & Hunter, agents for the Chandler and Cleveland. "We don't care whether we get cash or not. Cars sell easier on contract; the business has been built up along the part payment line and it is not only impossible, but I believe undesirable, to try to get it to a cash basis. Of course, we don't turn down cash offers, but we don't really solicit them."

There are many dealers who reflect this view. Yet there are a few who would like to get the full payment when the car is turned over. But there have been so few cars turned back and the banks generally are so willing to accept the paper that the line of least resistance has been followed, for the most part.

Royal Miller, of the Miller Auto Co., Dodge distributor, would like to get the money for every car he sells. He points out some difficulties, however.

"We would like to get cash for every car we sell," he says, "and we are working as much as we can toward that end, but we can do very little unless all the dealers get together on it, and they have not been able to do so, as yet. It is recognized that the automobile paper here is good, and cars, of course, sell more easily on contract.

"We are urging the payment of cash, or as much cash as possible, pointing out that the interest charges on deferred payments make the cost more, but many persons can't buy except on the contract plan, and we don't like to lose sales, of course. So a few of us are waging personal, one-handed fights against the credit plan, but it's a good deal like trying to push the tide back."

Motor Truck Manufacturers Talk Over Problems of Trade

Chicago, Oct. 12—Eighty-five per cent of the membership of the Motor Truck Manufacturers' Association met in convention here today to discuss some of the vital problems now confronting them. The opinion prevailed among the members that the present period of depression was to be of short duration and that the future of the motor truck industry was most promising.

That the prices of all commodities were on the decline was, of course, generally accepted and every manufacturer present was most anxious to do everything possible and reasonable to make the price of his product conform with the general tendency.

Hart-Parr Is Financing Its Dealers Through Local Banks

Is Depositing Money With Institutions in Each Community to Help Tractor Sales

CHARLES CITY, IOWA, Oct. 8—A plan for financing the sale of Hart-Parr tractors has been put in force the past week by the Hart-Parr Co. which will relieve the money stringency in all communities where these tractors are sold. In a communication to all banks wherever Hart-Parr dealers are located the company announces that it stands ready to deposit with the banks of such community sufficient money to finance all sales of its tractors whenever the local dealer or a farmer customer needs an extension of credit to complete the sale. The company invites all banks to confer with the Hart-Parr dealer in their town and make application for the amount of money they want deposited with them.

In each town where there is a dealer one bank will be appointed an official Hart-Parr depositary and instructed to draw immediately on the Hart-Parr Co. for sufficient funds to finance Hart-Parr tractor sales in that territory. This makes the company its own financing corporation for the sale of its tractors. The money which is paid for the tractor remains in that community for a definite period while the tractor is helping pay for itself, so that where banks have not the ready money the company finances all sales using the local bank as local agents to handle its funds in the transaction.

MOLINE TRUCK TO BE 1½ TON

Moline, Ill., Oct. 11—The Moline Plow Co., which recently acquired and reopened the old Midland automobile factory, will engage in production of a farm motor truck at the new plant. The truck, which will be known as Model 10, will be a 1½ ton, using a motor of the same design as that used in the Universal tractor, with pneumatic cord tires as part of the standard equipment. A. E. Walker, formerly of Detroit, is manager of the new factory.

PUGH PATENT UPHELD

Buffalo, Oct. 9—The Pugh patent 1,047,702 which covers the triple spoke lacing used in the great majority of wire wheels for automobiles was held valid in a suit brought by the Wire Wheel Corp. of America, the owners of the patent, against the Madison Motor Car Co. of Madison, Wis., in the United States District Court for the western district of Wisconsin. It was held that the patent is infringed by the type of lacing employed in the Frayer wire wheel made by the Phelps Mfg. Co. The significance of the decision lies in the fact that the wire wheel corporation is leaving no stone unturned in protecting the basic patents under its control.

Arranges Sales and Service Tour for P. E. Chamberlain

Under Association Auspices Talk Will Be Given on "Selling Service Intelligently"

ST. LOUIS, Oct. 8—During the continuance of the present condition of the retail automobile sales market, the National Automobile Dealers' Association has arranged for a "sales and service" tour by P. E. Chamberlain, for many years general manager of the R. R. Hall Cadillac Co., Denver, Cadillac distributors. Under the auspices of the association he will make a series of talks on "Selling Service Intelligently" and on the relation of service to sales, before trade bodies and special distributor gatherings and also will address civic bodies on the relation of the automobile industry to community progress.

Mr. Chamberlain has gained national prominence in the last three years through his development of sales and service. In recent months he has been in constant demand at meetings of the automotive trade associations. His address on selling service intelligently has attracted widespread attention. The success of this talk before the meeting of the Ohio & Kansas Automotive Trade Associations emphasized the need of the national association obtaining his services for similar work before other state trade associations. Harry G. Moock, general manager of the association, is now arranging a series of meetings for Mr. Chamberlain which he believes will be particularly valuable during the present condition of automobile retailing.

The acquisition of Mr. Chamberlain further strengthens the roster of speakers being sent to the trade by the N. A. D. A. Other men prominent in the industry for whom dates are being made by the association are Edward S. Jordan of the Jordan Motor Car Co. of Cleveland and A. R. Kroh, director of the "Motorization of the Farm" campaign. Arrangements for meetings for these speakers will be made upon request to the headquarters of the association in St. Louis.

DANIELS DESIGNING NEW BODIES

Reading, Pa., Oct. 8—Although the Daniels Motor Car Co. of this city will continue to make its present style of chassis without change for the present year, the company's engineers are designing two new body styles. One of these, which is nearing completion, is to be a four-passenger chummy roadster.

In addition to the new models, the company is contemplating a few changes in some of its closed body styles.

CRAIG-HUNT MOTORS IN COURT

Indianapolis, Ind., Oct. 11—The Craig-Hunt Motors Co., which has been planning to manufacture a small car in this city, has gone into receivership on petition of the Chester L. Zachiel, receiver of the Great Northern Health & Accident Co. of North America. John W. Sullivan was named as receiver by Judge Harry Chamberlain in the Marion Circuit Court. The complaint alleged that the defendant company was indebted to the plaintiff to the amount of $125.50 on a promissory note given March 9 and due thirty days later. The complaint placed the assets of the Craig-Hunt company at $1,000 and charged that the company was in danger of insolvency.

The St. Paul Closed Car Show Netted Many Sales

View of closed car show staged by the St. Paul Closed Car Association. None but closed cars were exhibited and numbered fifty-three different makes

MOORE PLANT OPERATING

Moore, Pa., Oct. 8—The local factory of the duPont Motors Co. of Wilmington, Del., is now being put into operation with capacity of 150 cars a month and facilities for turning out at least fifty more. The local works will continue to make engines for the cars.

Small Receiver Discharged and Another One Appointed

Indianapolis, Oct. 8—Bankruptcy proceedings against the William Small Co. of this city, manufacturers of the Monroe automobile, brought last August by the Warner Malleable Co., Hoess Brothers of Hammond, Ind., and the Columbus Bolt Co. of Columbus, were dismissed in a hearing before Judge Albert B. Anderson in Federal Court yesterday. Judge Anderson adjudged the company to be solvent and discharged the Union Trust Co. as receiver.

The ruling was made at a hearing on the petition of the Vonnegut Machinery Co. for authority to retake from the receiver about $30,000 worth of machinery delivered to the William Small Co. under written conditional sale contracts. Immediately following the ruling of Judge Anderson the Indianapolis Body Corp. filed a suit for receivership and Judge Solon B. Carter of Superior Court appointed James W. Fesler receiver for the company. It is generally understood that this last suit for receivership was a friendly one, and that 85 per cent of the creditors of the William Small Co. have agreed to give an extension of credit for one year. No definite plans have been announced, but it is thought that the receiver will put the factory in operation again.

Decorative Effects Brilliant at Closed Car Show in St. Paul

Thousands of Visitors Include Prospects from Neighboring Cities—Fifty-three Models Displayed

ST. PAUL, Oct. 8—What was strictly a closed car show has just ended in this city, fifty-three different models actually sold in St. Paul having been on display. Thousands of people from St. Paul, Detroit, Chicago, New York and other large cities attended and a large number of sales resulted on the display floor during the progress of the exhibit. The show was held at the St. Paul auditorium under the auspices of the St. Paul Closed Car Association of which W. S. Williams is manager.

The decorations consisted of great festoons of smilax expressed here from Alabama and were draped from the center of the ceiling to the balcony railings below. Woven in and out among the smilax were small electric lights to represent the stars and behind the smilax was a crescent to represent the moon.

The main stage of the auditorium was built out over the orchestra pit and first few row of seats adding floor space which made the total display over 20,000 feet. This space was divided into twenty-three booths each furnished with palms, ferns and chrysanthemums, the latter in large gilt vases. A massive nine-foot white post separated each booth and on top of each post was an illuminated globe. Wires were strung from post to post upon which was displayed the name of the make of car displayed. These wires and arches were covered with maple leaves.

NEW CHEVROLET STATION

Cincinnati, Ohio, Oct. 11—A service and assembling station will be built in Cincinnati by the Chevrolet Motor Car Co. The main building will have floor space of 18,000 sq. ft. The building will house both the salesrooms and the wholesale department.

Greater Business in Tractor Sales Is Expected in South

Farmers Will Practice Diversification More Next Year with Cotton as Side Line

ATLANTA, Ga., Oct. 8—Tractor dealers in the Atlanta territory, which includes Georgia, Florida, Tennesee, Alabama and North and South Carolina, are preparing for the largest volume of business during the coming six months that the industry has ever experienced in this section.

Perhaps the main reason for this lies in the fact that diversification will be more widely practiced in the South next year, many farmers raising cotton merely as a side line. In fact, officials of the American Cotton Association predict that there will be a 50 per cent decrease during next year in the cotton acreage. This, of course, will greatly stimulate the demand for modern power farming machinery, mainly tractors, as diversification cannot be practiced successfully without the aid of modern machinery on account of the acute agricultural labor shortage in the South.

Dealers Will Have Own Display

During the Southeastern fair virtually all of the local tractor and implement dealers will have displays, and there will be daily demonstrations by various tractors. Inasmuch as the annual fair always brings many thousands of rural visitors to the city the demonstrations and exhibits will attract broadspread interest for the Southern farmer was never more open to conviction than he is now because of the wide publicity that has been given to power farming by the newspapers all over the South.

During 1920 most of the local dealers report they have experienced a volume of business that is at least 50 per cent greater than 1919 and several hundred per cent greater than four or five years ago.

The Cleveland company alone reports that it is selling on an average of 120 Cletracs every month, and further states that the total volume of business in this district for 1920 will almost reach $1,500,000. Other dealers report sales in about the same ratio, and predict that 1921 will experience a still greater demand.

COUNTY HAS CAR SHOW

Edwardsville, Ill., Oct. 8—The first automobile show to be held here will take place under the auspices of the Madison County Automobile Association Oct. 15 to 17. The exhibits will be under tents on the LeClaire campus grounds.

ACTION AGAINST SIMMS MOTORS

Atlanta, Ga., Oct. 8—A petition in bankruptcy has been filed in the Federal Court here against the Simms Motor Car Corp., which has been in the process of organization here for several months. Judge Samuel H. Sibley has issued an order restraining the corporation from disposing of any of its holdings. Claims against the company filed so far and that caused the petition amount to less than $1500.

The board of directors of the Simms Motor Car Corp., recently organized in Atlanta to manufacture a light weight, medium priced automobile, announced last week the resignation of J. H. Simms as vice-president and general manager of the corporation. Mr. Simms, it was stated, had sold his entire holdings in the new company and was succeeded by H. L. Innes.

GAS RECORDER COMPANY FORMED

Hartford, Conn., Oct. 8—The Gas Oil Recorder Co. has been organized here for the manufacture of recording devices for gasoline and oil pumps invented by H. H. Patterson of Hartford. The company has already built 100 machines and has placed a number of them on gasoline pumps in Hartford on order. A second lot of 500 machines is now in production.

TRACTOR BRANCH TO RESUME

Waynesboro, Pa., Oct. 8—A letter from the main office of the Emerson Brantingham Co., Rockford, Ill., to the local organization which dismissed a large part of its force recently states that the local plant will resume about the middle of this month or no later than Nov. 1 and that the old force will be put back as rapidly as conditions permit.

Merger of Maxwell-Chalmers Assured by Refinancing Plan

New York, Oct. 8—Under a refinancing plan worked out by a committee representing the stockholders, the bank creditors and the merchandise creditors, formal consolidation of the Maxwell Motor Co., Inc., and the Chalmers Motor Corp. is assured. This plan provides for new capital in the sum of $15,000,000. Present stockholders will be given an opportunity to reinforce their equity by subscribing to the stock of the new company but if they fail to do so it will be underwritten by a syndicate headed by Blair & Co. of this city. Stockholders who do not deposit their securities will forfeit most of the value of their holdings and it is expected they will take a large part of the offering.

The new company will have an authorized capital of 1,000,000 shares of which 200,000 shares are to be Class "A" stock, par value $100, and 800,000 shares Class "B" stock, no par value. It is estimated that there will be issued immediately 153,000 shares of the former and 620,179 shares of the latter stock. Class "A" stock is to have priority over "B" stock both as to assets and non-cumulative dividends up to $8 a share with a right to participate in the "B" stock in dividends in any year after $8 has been paid on both classes.

The time for subscription for new stock expires Nov. 1, 1920.

Newly Organized Axle Co. Shows Commonwealth Interests

Walker Axle Co. Incorporates With Edison Officer as President—New Factory Planned

CHICAGO, Oct. 8—The Walker Axle Co. has been organized with a capitalization of $2,500,000 to manufacture the Walker balanced double reduction rear axle for motor trucks. William A. Fox is the president; G. A. Freeman, vice-president and general manager; John F. Gilchrist, treasurer; William S. Kline, secretary, and George R. Walker, chief engineer. The general sales manager is Lloyd J. Bohan.

The personnel indicates another branching out into the automotive field of officials of the Commonwealth Edison Co. of Chicago. Mr. Fox is vice president of the Commonwealth company, president of the Walker Vehicle Co. and director of the Edward Valve & Mfg. Co., and Mr. Freeman is the vice president and general manager of the Walker Vehicle Co. Mr. Walker is the former chief engineer of that company and inventor of the drive. Mr. Gilchrist is one of the vice presidents of the Commonwealth company and is president of the Federal Electric Co. of Chicago.

New Axle Plant Proposed

The Edward Valve & Mfg. Co. at its plant in East Chicago, Ind., is now manufacturing the axles but it is proposed to erect a plant to be devoted exclusively to the manufacture of the Walker axles at Eighty-seventh and State streets, Chicago, adjacent to the new modern factory buildings of the Walker Vehicle Co. and the Federal Electric Co.

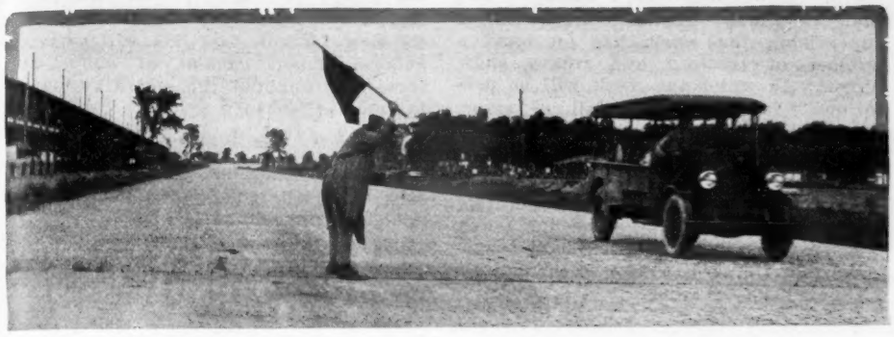
The Walker Vehicle Co. has been in existence for the last ten years or more and is the largest manufacturer of electric trucks in the country. For the same period the Walker axle has been used on these trucks. The product of the newly organized Walker Axle Co. will be a development of that axle for use of gasoline trucks.

VOTES TO JOIN N. A. D. A.

Lancaster, Pa., Oct. 8—Affiliation of the Lancaster Automobile Trade Association with the National Automobile Dealers' Association has been decided upon, at a special meeting of the local body in the Hotel Weber. Plans for the holding of the annual automobile show this winter will be made at the annual meeting of the association which takes place this month.

DELAGE OPENS SALESROOM

New York, Oct. 2—The Delage automobile is one of the most recent of foreign cars to open a salesroom in this city. Percival K. Frowert Co., Inc., has this car on display at 26 West 58th St. The chassis is listed at $12,000 and the complete car is priced in the neighborhood of $18,000. The sales company announces that three American body builders are making bodies for these cars.



Loaded 1½-ton Duplex truck starting on 24 hour demonstration run at Indianapolis Speedway

Truck Test Shows What Can Be Done in Way of Express Service

Duplex Company Product Makes Fast Time in Indianapolis—New York in a Day

INDIANAPOLIS, Ind., Oct. 8—A unique test has been completed on the speedway here to determine the ability of a 1½-ton truck equipped with pneumatic tires for long distance express hauling. The truck manufactured by the Duplex Motor Truck Co., Lansing, Mich., was loaded with ballast and operated continuously for 24 hours without stop. A special gasoline supply was mounted in the truck body so as to provide sufficient fuel for the 24-hour run and the oil was fed from the gas tank ordinarily used for gasoline. The truck, which was otherwise a stock model, negotiated 935 miles in the 24 hours, an average speed in excess of 38 miles per hour. The truck was not stopped during the entire run; in fact, did not slow down below 35 miles per hour.

Parts Makers Interested

The test was watched with great interest by a great many of the manufacturers who furnish parts for this truck. It is equipped with a Hinkley 4 by 5¼ engine; Firestone pneumatic cord tires; Stromberg carbureter; Champion spark plugs; Westinghouse starting, lighting and ignition; Sheldon axle, front and rear, with Hess Bright bearings; Covert transmission; Johns-Manville speedometer; Peters universals; Prest-o-lite battery and Ross steering gear.

The truck weighed 8300 lbs. at the start of the run, of which approximately 3300 lbs. represented pay load and gasoline. The timing was done by chronometer, a record being taken of the time on each lap. The speed remained remarkably constant, being at no time below 35 miles, and at no time above 42 during the 24-hour run. At the conclusion of the run and without stopping the truck, one lap of the speedway was made in 3 min. 26 2/5 sec., or at about 44.5 miles per hour.

The industry is particularly interested in this test because of the fact that the Indianapolis Speedway is in no better condition at the present time than the average hard surface road. As a matter of fact, at one place there is a temporary bridge structure over which the truck had to pass, due to the fact that some repairs are being made to a portion of the track. This demonstration, therefore, is illustrative of what could be done with properly policed highways and with the right-of-way given to through trucks mounted on pneumatic tires and adapted for high speed running. The distance, 935 miles in 24 hours, means a trip from New York to Chicago in this time, just a little slower than what is made by the limited passenger trains. What could be done in the way of truck transportation, provided proper dispatching systems and road clearances were given to fast express trucks, is clearly shown by this demonstration.

European Maker Drops Prices to Meet Ford Cut

BY W. F. BRADLEY

European Correspondent of Motor Age

Paris, Oct. 11—(By Cable)—Citroen has countered the drop in Ford prices by announcing a decrease of 20 per cent in his open models and 25 per cent in closed car prices. He declares, however, that these reductions will go into effect only if enough orders to justify them are rereceived in the next fifteen days. Prospective purchasers who file orders are informed that they will not be compelled to buy unless the price cuts are made effective. The prevailing impression is that the new prices will stand regardless of the number of orders received.

INDIANA DEALERS TO ORGANIZE

Indianapolis, Oct. 11—The formation of an association of Indiana dealers is under consideration. At present there is no such organization and there is a growing demand for one throughout the state. The question will be considered at a meeting of the Indianapolis association to be held in the chamber of the House of Representatives in the State House, shortly after the election next month.

BADGER SALESMEN MEET

Milwaukee, Oct. 8—Following the practice established last year, the Badger Mfg. Corp. has held its second annual sales convention. The conference covered a period of four days and was attended by the entire sales force as well as the executive officers and the managers of the different departments.

Bureau, to Be Formed, Will Put One Value on Traded-in Trucks

Two Appraisers Will Make Inspections, Set Prices and Report Back to Dealers

PHILADELPHIA, Oct. 8—There is now under consideration in Philadelphia the formation of a bureau, or exchange, for trucks taken by dealers on trade-in propositions. The plan has progressed to the point where, following the presentation of the plan in outline before the board of governors and the heads of special committees of the Motor Truck Association of Philadelphia, there will be a special session of the proprietary members of the association to discuss and possibly act upon the plan.

While in past years the advantages of such a bureau have been discussed without immediate intention of forming one the present proposition already has met with favor from numerous dealers who know something of the success of an exchange in such cities as New York, Reading, Cleveland, Rochester and Troy.

Will Appraise Value

The new movement for the bureau was started by Charles M. Lahm, sales manager of the recently formed United Motors, Inc., who presented his viewpoint at a luncheon of the truck association's governors and committee chairmen. If it is decided to go ahead with the bureau it will be a gradual process. The general procedure would be about as follows, according to present plans:

When a customer brings his truck to a dealer and offers it on a trade-in basis, asking what allowance will be made on it, the dealer will telephone to the bureau for the standard price on a truck of that description.

The bureau will send an appraiser to look the truck over and report to the manager of the bureau on his findings, the truck, of course, being appraised as it stands. The manager will review the appraiser's findings, take other things into consideration and will name a standard price on the truck to the dealer.

When the price has been given to the dealer, if the prospect goes to another dealer the same formula will be gone through and the same price named in each instance for the same truck except that it will not be appraised again.

It is proposed to have an office with a manager in charge, two appraisers and a stenographer to start the bureau.

It is believed that the bureau will be of advantage to the dealers in Philadelphia through checking the present manner of handling traded-in trucks. Dealers in many instances now, in self defense, are allowed three and even four times the value of traded-in trucks in order to get the business. In each case the dealer in reality is making such allowance not because he things it is right but because he wants to beat his competitor to the trade.

Corporation Affiliates Hupp and Mitchell in Body Making

Racine, Wis., Oct. 7—Announcement is made of the formation of the H. & M. Body Corp. capitalized at $1,575,000 with preferred stock fully paid, and 15,000 shares of common stock of no par value. The entire stock in this new organization is jointly owned by the Mitchell Motors Co., Inc., and the Hupp Motor Car Corp.

While the Mitchell company has been manufacturing its own bodies, the Hupmobile bodies have been bought in the open market. The joint operation of the body plant in Racine, one of the most complete of its kind in the country, will result in employing facilities and equipment at maximum efficiency and capacity.

The directorate of the new corporation is composed of officials of both the Mitchell and Hupmobile companies.

RECEIVER FOR TRENT RUBBER

Trenton, N. J., Oct. 13—John O. Bigelow has been appointed receiver of the Trent Rubber Co. upon petition of the McLain, Hadden Simpers Co. and Carl Ludwig. His bond has been placed at $25,000. The receiver will continue the business of the company.

PREPARING FOR SNOW

Detroit, Oct. 8—Highway department heads throughout the state are preparing a drive on snow in the effort to keep Michigan trunk roads in condition for travel throughout the winter. The State Highway Department, which is supervising the work, has on hand a number of tractors and rotary snow plows with which the work will be performed. With the first fall of snow, active work will be begun and will be continued throughout the winter.

The railway congestion, in the opinion of highway men, makes it imperative that the roads be kept open for truck transportation between cities and towns which heretofore has been prevented by reason of heavy snows.

New Affiliations in Industry Made by Three Former Racers

Akron, Ohio, Oct. 8—Ralph H. Upson, holder of the Gordon-Bennett international balloon race trophy and captain of the American team in the international races to be held at Birmingham, Ala., Oct. 23, has severed his connection with the Goodyear Tire & Rubber Co., where he has been chief aeronautical engineer for several years. He leaves to join a company now forming with New York and Detroit capital financing it to build and operate dirigibles for commercial traffic between the important cities of the United States. The new company is expected to be organized about the first of the year when what is called an entirely new idea in the development of lighter than air craft will be attempted.

San Francisco, Oct. 9—T. J. Beaudet, known as "Teddy" Beaudet, racing driver, has joined the forces of the Walter M. Murphy Co., California distributors for the new Lincoln car. He will serve as general superintendent of shops and service throughout the entire system of Murphy branches.

Hartford, Conn., Oct. 8—George Babcock, formerly a racing driver of note throughout the West as a driver of Peugeot cars, has joined the Hartford Buick Co. and will take charge of the service and new car delivery departments.

CALL TOGETHER SERVICE MEN

Indianapolis, Oct. 9—A meeting of managers of the service departments of automobile dealers of Indianapolis has been called for October 21 by John Orman, manager of the Indianapolis Automobile Trade Association. The meeting will be devoted to consideration of winter service, labor conditions and to a better understanding of problems peculiar to Indianapolis. It is expected that about eighty-nine service managers will attend the meeting.

Trade Association Formed by Tennesse Automotive Dealers

Nashville, Tenn., Oct. 8—Dealers in the automotive trade in the state have perfected the Tennessee Automotive Trade Association, initial steps having been taken for its formation at a recent meeting at Signal Mountain Inn, Chattanooga. Headquarters will be opened in Nashville, with Robert S. Henry in charge.

A state wide membership by towns and counties will be attempted, the membership being open to dealers in automobiles, trucks, motorcycles, airplanes, tires and other equipment. The object of the association is the betterment of trade conditions and the working out of detailed problems of the industry. James S. Frazer, Nashville, is the president; T. H. Smart, Memphis, vice-president, and R. H. Hart, Chattanooga, treasurer. The directors are W. R. Hamilton, Knoxville; A. D. Etheridge, Chattanooga; L. M. Hirsig, Nashville, and N. F. Ozburn, Memphis. C. A. Noone, Chattanooga, is the general counsel.

RECEIVER FOR STANDARD AXLE

Chicago, Oct. 9—Upon the application of attorneys representing at least three creditors, Edwin D. Buell was today appointed receiver of the Chicago Standard Axle Co. by Judge George A. Carpenter in the United States District Court here. The action follows creditors' meetings held from time to time in the hope that some way could be found to continue operations. The liabilities of the company are given as $140,000 with the value of the assets consisting chiefly of machinery, etc., not named. A number of reasons are given for the receivership among them being cancellation of orders. The appointment of a receiver was made with the consent of the company.

Concerning Men You Know

J. H. Hardgrove, Avery salesman, traveling out of the Madison, Wis., branch has been promoted to branch house manager at Columbus, Ohio, a position he recently took over following the resignation of the former manager, F. J. Kitchen. W. H. Mack, who has been assistant to Mr. Hardgrove, will take over his territory.

John M. Stockfish, formerly a sales representative for the Tide Water Oil Sales Corp., and recently a sales agent for gasoline, has become sales manager for the Lubricating Oil Division of the Associated Oil Co., St. Louis.

Barney Oldfield, President of the Oldfield Tire Co., Cleveland, has recently added to his sales organization Ernst H. Brandt, formerly western sales manager of the Ajax Tire & Rubber Co. Mr. Brandt will act as district manager, making his headquarters at Chicago. His sales district includes eastern Montana, North and South Dakota, Minnesota, Wisconsin, northern Michigan, Iowa, Illinois and Indiana.

Joseph G. Roberts, for the past three years manager of the Chicago branch of the Nash Sales Co., has been awarded the Nash distributing franchise in Philadelphia.

James Malone, well known along automobile row, has been appointed retail sales manager of the Lexington-Chicago Co., Chicago., distributors of Lexington and Gardner cars.

K. D. Sheldon, former assistant manager of the Ford assembling plant at Boston and previously stationed at Toledo and Cincinnati, has arrived at Cleveland to take up the duties of general manager of the Ford assembling plant there, succeeding E. M. Fillmore.

W. H. Yeldell, formerly secretary and sales manager of the Banner Buggy Co., St. Louis, has been put in charge of sales promotion work of the Gardner Motor Co., St. Louis.

James W. Turner, general sales manager of the Maxwell-Chalmers Sales Corp. of Philadelphia, has been placed in charge of the Baltimore branch of the corporation. J. Dale Goodfriend succeeds Mr. Turner at Philadelphia.

L. M. Van Riper, formerly branch manager for the United States Tire Co. in Chicago, and lately manager in Detroit for the Ajax Rubber Co., Inc., has been appointed western sales manager of the Ajax company with headquarters in Chicago.

H. L. Beckwith, for the last eight years connected with General Motors Truck Co. at Pontiac and for years prior to that in the service and sales end of the industry, has been made general manager of the King Trailer, Ann Arbor, Mich. E. A. Soper, also formerly with General Motors, has joined the King Trailer to handle the accounting end of the company.

Alfred Henry, a veteran on Detroit automobile row, has joined the Ray Battery Sales Co. Mr. Henry was with Chandler and Stearns-Knight.

S. Boeldy of the Boeldy-Newreither Motor Sales Co., in Grand Rapids, has purchased the interest of his partner and has added a service station to the garage which the firm has been conducting.

C. R. Graves, manager of the Lansing Fuel & Gas Co., Lansing, Mich., has joined Garlock Sales Co., distributors of Overland and Willys-Knight products in Lansing, as sales manager.

Junius F. Cook of Cleveland has been appointed special sales representative of the Cleveland Tractor Co. in South Africa.

C. B. Peironnet, manager of the Philadelphia Nash Motor Co. for the last three years, has been made manager, with an interest in the business, of the recently organized Camden branch of the Philadelphia Nash Motor Co.

New Wisconsin Association Planning Vigorous Campaign

At First Annual Meeting T. C. McMillan, Milwaukee Dealer, Chosen President

MILWAUKEE, Wis., Oct. 8—Thomas C. McMillan, secretary-treasurer of the Overland Wisconsin Co., distributor, and Geo. W. Browne, Automobiles, Inc., dealer in the Overland and Willys-Knight, was elected president of the Wisconsin Automotive Dealers' Association at the first annual meeting of the board of directors held at Green Bay, Wis. Mr. McMillan is president of the Milwaukee Automotive Dealers' Association, and took the lead in initiating the movement to organize the trade in Wisconsin which culminated in a big convention held at Milwaukee during the State Fair to perfect an organization. The other officers are: Vice-president, Charles J. Collier, Green Bay; secretary, Bart J. Ruddle, 105 Wells street, Milwaukee; treasurer, Guy R. Wood, Eau Claire. Mr. Ruddle is executive secretary and manager of the Milwaukee Association and for more than twelve years has been a prominent figure in local and national dealer organization activities.

The first annual convention will be held in Milwaukee on Wednesday, Jan. 19, during the annual winter show of the Milwaukee association in the Auditorium. While no official announcement of the show dates has been made, it has been tentatively decided to hold it from January 14 to 21.

Campaign for More Members

In the meantime a vigorous campaign will be waged by Secretary Ruddle to enlist at least 1000 to 2000 licensed dealers in Wisconsin as members of the state association. Other major activities already undertaken are to convince the banking and other financial interests of the state by presenting an impressive and imposing array of facts and figures concerning the second largest industry in America, to obviate any discrimination shown in the acceptance of dealers' paper and to change the general attitude toward the trade.

KANSAS CITY SHOW IN FEBRUARY

Kansas City, Mo., Oct. 1—The annual passenger car show of the Kansas City Motor Car Dealers Association will be held the week of Feb. 12 to 19, 1921. It has not been definitely decided by the Association where the show will be held this year but negotiations are now under way to obtain the Overland Building.

MUSKEGON BUSES MERGE

Muskegon, Mich., Oct. 11—The state public utilities commission has approved plans for the formation of the Muskegon Jitney Bus Corp. capitalized at $200,000. It will operate all the jitney lines in Muskegon. The utilities commission takes the position that where the traffic justifies jitney lines to supplement street car service, formation and operation of such companies will be fostered. The lines now operating in Muskegon have proved of great benefit to the public and have proved successful financially for the operators. The merger of all the lines into the one corporation is expected to increase the business materially.

BUILDING SHALE OIL PLANT

Kansas City, Mo., Oct. 12—The Grand Valley Oil & Shale Co., headed by southwestern oil men with headquarters here, is building, at Grand Valley, Colo., the first commercial oil shale reduction plant in the country which is a 300-ton plant costing over $200,000. The Stalmann process for producing crude oil has been adopted and the Wells oil refining process producing a high percentage of both gasoline and high grade engine oils will be installed. By this process a ton of shale will produce 56 gal. of crude oil per ton, it is said, which will refine into 19 per cent gasoline and 50 per cent engine oil beside many other products useful to the industry.

Instruction to Be Given in Salesmanship and Mechanics

Davenport, Iowa, Oct. 10—Equipment valued at $10,000 is being installed in the automotive school to be opened here under supervision of the Y. M. C. A. with Roy R. Fisher as director. Teachers will include O. L. Smith, efficiency engineer at the Velie Motors plant; Paul Ehlers, late of the Zimmerman steel plant and J. W. Hobbs, assistant engineer at Rock Island arsenal.

Three floors and basement of the building with floor space of 15,000 sq. ft. will be devoted to practical shop work and lecture rooms. Many classes are open to women as well as men, especially in the car owners' and drivers' course. Special attention will be given to the tractor industry and a Liberty 12 engine has been secured for study purposes in the aeroplane engine classes. A course in salesmanship is to be added to the school curriculum.

The Tri-City Auto Trades Association, many local firms and factories are supporters of the school.

JACKSONVILLE TO HAVE SHOW

Jacksonville, Fla., Oct. 8—The fourth annual automobile show of the Jacksonville Automobile Dealers' Association will be held Nov. 18 to 27 inclusive under the auspices of that association. The executive committee handling the show is composed of C. C. Kirby of Mangels & Kirby Co.; Scriven Bond of Scriven Bond Motor Co.; and Howard Boss of Florida Oldsmobile Co. This committee is to work in conjunction with Gus Johnson, president of the association, and under his guidance it is believed the show will be a big success. In addition to the present building giving the dealers 12,000 sq. ft. floor space, plans are being made for the construction of another building giving them 9,752 sq. ft. additional show space. All dealers are enthusiastic about the exhibit.

Georgia Dealers to Convene at Time of Car Show and State Fair

Bankers to Be Invited to Tell How Present Situation Can Be Bettered

ATLANTA, Ga., Oct. 8—The board of directors of the Georgia Automotive Dealers' Association, of which William L. Mathers, of Atlanta, is president, met recently and decided to hold a special convention of the association sometime during the annual automobile show to be held in connection with the Southeastern fair at Lakewood park, Oct. 16 to 26. No program has been announced as yet, and no definite date decided upon.

It is planned at this meeting to thoroughly discuss business conditions and to try to formulate plans for the stimulation of sales during the coming fall and winter months. It is also planned to discuss ways and means whereby the banks can be influenced to curtail their credit restrictions, and the same action brought about as regards the Federal Reserve Board.

Mr. Mathers stated that efforts will be made to get two or three prominent bankers to address the convention, especially those who are not afraid to express their views regardless of whether they agree with the policy of the Federal Reserve Board. These bankers will be asked to tell the dealers what they can do to bring about a modification of the present credit ruling that is so seriously affecting business all over the country.

THREE SALES CONVENTIONS HELD

Kansas City, Mo., Oct. 10—In the past week district sales conventions of Dort, Oakland and Studebaker dealers from western Missouri and Kansas were held in this city. In an address before the Dort gathering H. C. Flower, chairman of the board of directors of the Fidelity National Bank & Trust Co., of this city, said: "Motor cars are an absolute essential and are so recognized by us."

Bondholders May Attempt to Operate Cincinnati Speedway

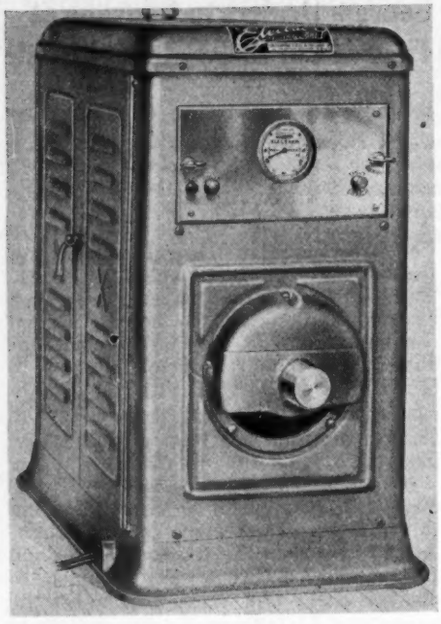
Cincinnati, O., Oct. 9—Bondholders of the Cincinnati Speedway, near Sharonville, may realize little more than 10 per cent on their investment of $200,000, while stockholders in the speedway will realize nothing.

The extent of the failure of the speedway was disclosed when court steps were taken a few days ago for sale of the speedway property to the bondholders of the company for $80,000. As the bondholders must pay $50,000 in cash to preferred creditors and court and attorney costs, they will realize only a small part of their investment.

Attorneys told the court that if the bondholders bought the property they might try to operate it and earn a profit for further distribution. The date for the actual sale has not been fixed and this point will not be decided until that time.

Complete Enclosure Feature of Electrion Farm Light

Special Construction of this Plant Facilitates Service Operations—Units Interchanged by Merely Sliding Out Control Unit

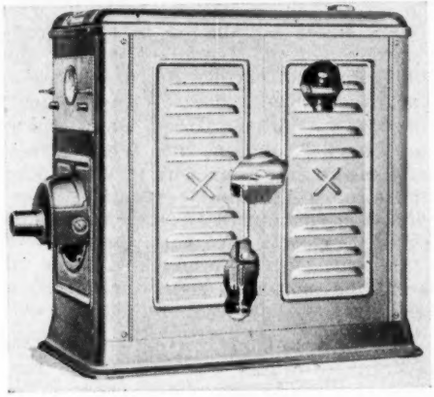


The Electrion isolated power plant from an appearance standpoint is one of the most unusual outfits ever made. It is entirely enclosed and those moving parts which need periodical inspection are made very accessible by lifting side covers

HE farm light in connection with service has always presented a perplexing problem and the Linderman Steel & Machine Co., Dayton, Ohio, with factories at Muskegon, Mich., and Woodstock, Ont., appreciating the difficulty of this factor have gone into the design of the farm light very thoroughly, and have produced a farm light that from the service standpoint is unique. To prevent the curious owner from prying into this part and that part of the Electrion, the farm light manufactured by this company, they have completely enclosed the machine, and no parts are left exposed which might be tampered with. Then those units which need inspection are so installed that they can be removed from the case just as a drawer is removed from a desk.

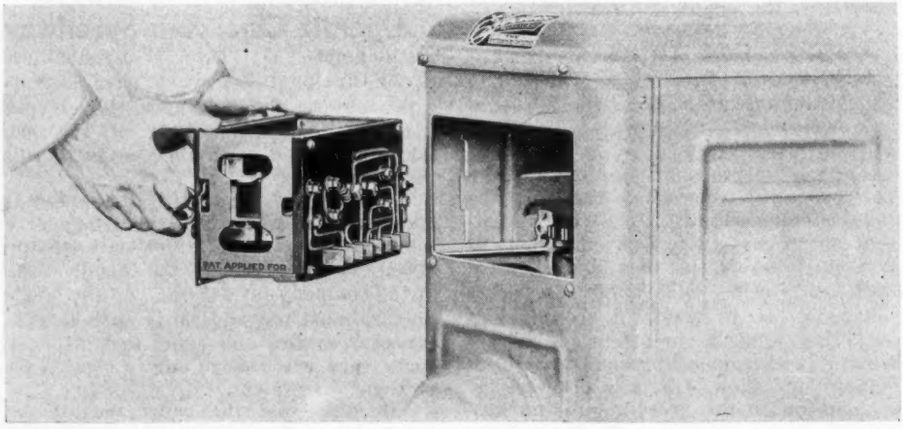
Three styles of lights are made and each is completely enclosed, the picture shown being representative of the three types, which are of the 32-volt semi-automatic, 32-volt full automatic and 110-volt full automatic type. Each unit is of 1000-watt capacity. The question of enclosure has not been confined to the farm light only for the battery units in connection with the semi-automatic outfit are also enclosed in a neat compartment which is provided with a vent for carrying off the fumes from the batteries.

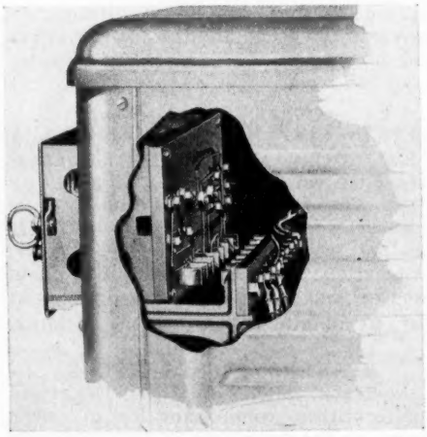
The engine of this unusual appearing farm light is of the valve-in-head type and has one cylinder. Its bore and stroke is 2⅞ by 3 in. The engine is electrically governed and its speed is normal at 1600 r. p. m. The valves are of nickel steel and are so large that they completely fill the head of the combustion chamber. Water cooling is employed and this is of the motor car type. A large radiator is placed at one end of the cabinet where a fan draws the air through the radiating pins. The circulation of the water is by thermosyphon action. The camshaft, crankshaft and connecting rods are all drop forgings and are heat treated. All engine bearings are of the bronze back babbitt type similar to those employed in motor cars, with the exception of the main bearings which are of the S. K. F. double row self aligning ball bearing type. A cast grey iron piston is used whose surfaces are ground. The compression chamber being of the concentric type is machined all over which reduces the possibility for accumulation of carbon. The tappet guides are so positioned that by removing a cover in the cabinet access is easily made. The



Showing the various parts which need periodical attention. One is a small grease cup on the fan pulley, the other is the fuel gage and the position for pouring in oil

fuel tank is in the base of the engine and has a capacity of 2¼ gal. It is filled through a convenient plug at the top of the cabinet. The carbureter is specially designed for this job. It is of the overflow type and has one adjustment; no float valves or springs are used in the





To the right is the removable cabinet which contains all the electrical devices used in the control of the light. Should the owner of a semi-automatic type wish to change to a full automatic type he has but to install a new cabinet and this is slid into place just as a drawer is. Left—The electric control lifted from its place

Specifications of the Electrion

32 VOLT BATTERY UNITS

	Model SBI Semi-Automatic	Model ABI Full-Automatic
Capacity	1000 Watts	1000 Watts
Voltage	32 Volts	32 Volts
Number of 20-watt Lamps	50	50
Lamp Voltage	32 Volts	32 Volts
Make Engine	Own	Own
Number of Cylinders	1	1
Horsepower	2½	2½
Fuel	Gasoline or Kerosene	Gasoline
Cooling	Water	Water
Power Pulley	Separate Attachment	Separate Attachment
Generator Drive	Direct	Direct
Make of Generator	Own	Own
Starting Engine	Push-Button	Automatic
Stopping Engine	Automatic	Automatic
Governor	Electric	Electric
Dimensions of Electrion		
—Height	29 In.	29 In.
—Width	16 In.	16 In.
—Length	28 In.	28 In.
Net Weight of Electrion	450 Llbs.	450 Llbs.
Ship. Weight (crated)	520 Llbs.	520 Lbs.

carbureter. A positive driven type pump forces the fuel from the lower tank to the carbureter. The oiling system is through splash. A Dixie magneto provides for ignition.

The two 32-volt outfits, one being semi-automatic and the other full automatic are identical with the exception that when, with the full automatic, the current taken from the battery reduces its charge to about two-thirds full, the engine starts automatically and completely recharges the battery, stopping automatically when that point is reached. With both types, however, if at any time more than a normal load for the battery is being consumed, the engine starts automatically and continues to operate with the battery floating on the line until the load is reduced to the battery capacity, then the battery again takes up the load.

Safety devices are provided that stop the engine in the event of engine conditions such as lack of fuel, low water in the radiator, or lack of oil.

The full automatic 110-volt light starts with a 6-volt storage battery similar to that used on a motor car. In fact, should it so happen that the 6-volt battery through negligence becomes inoperative the battery from any motor car may be removed and connected up with the generator and it will immediately start functioning.

Roads Subjected to Less Impact With Giant Pneumatics

Bureau of Roads Tests May Determine New License Basis

IT has long been felt that the cushioning effect of a giant pneumatic tire produces much less deterioration of the road surface than a solid tire.

Impact tests conducted with trucks equipped with solid and pneumatic tires now being conducted by the Bureau of Public Roads to determine the forces exerted by motor trucks have been highly successful. The data obtained is expected to influence highway officials in various states in obtaining a rational basis for calculating license fees for motor vehicles.

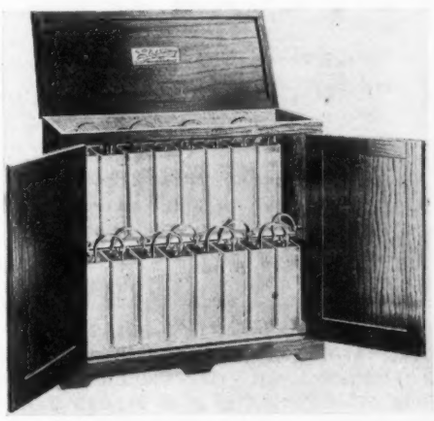
In order to obtain reliable information as to the relative effects of old and new tires from the standpoint of impact on the roadway, the investigators used a 3-ton Packard truck loaded with a 4½-ton load adjusted to make the total weight on each rear wheel 7,000 lbs., the unsprung portion being 1,700 lbs. and the sprung portion 5,300 lbs. An old solid tire worn down to a 1 in. thickness was used in the first experiment; a new solid tire 2½ in. thick and then pneumatic tires 42 by 9 in. inflated to a pressure of 142 lbs. per square inch completed the assortment.

The results showed clearly that solid tires worn down to 1 in. or less damaged the highways while the pneumatic tire produced a relatively light blow. The actual record is given in the following table:

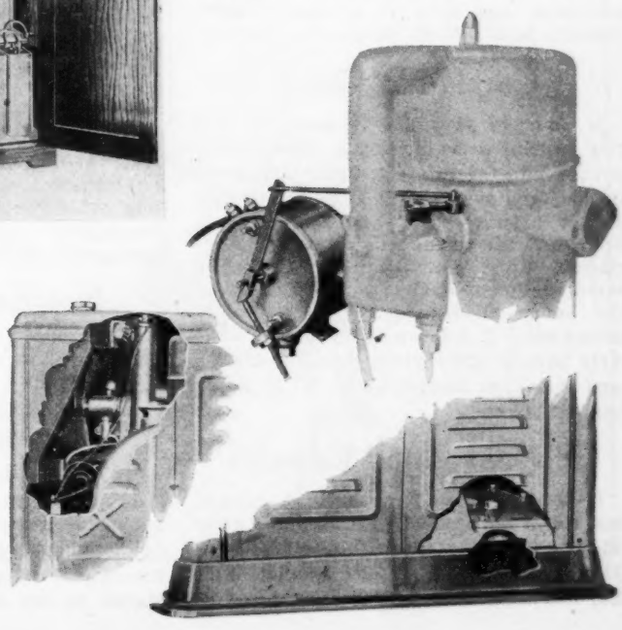
Approximate speed.	Height.	Old tire.	New tire.	Pneumatic tire.
5.7	2 in.	11,600	9,400	7,100
10.2	do	18,500	14,100	7,800
14.6	do	26,500	18,700	8,300

For the purpose of obtaining accurate measurements the Bureau of Public Roads planned a simple device for producing artificial compact conditions. The apparatus consists of specially prepared copper cylinders which are deformed by the blow. The motor truck has been much abused by various councilmen and paving officials in cities where the traffic is heavy. To bring about a clearer understanding of the effects of trucks on various pavement designs, the Bureau has tested forty-nine different types of pavement under extraordinary conditions. A special truck equipped with five cast-iron wheels is being used in this investigation, the results of which will be made public shortly.

Slabs have been subjected to similar tests. A machine designed to give impact conditions resembling those of a heavy truck is used by the highway officials. The unsprung portion of the weight of this machine is 1,500 lbs. and the sprung portion weighs 6,000 lbs. The tests were made by raising the entire weight through a height of ⅛ in., allowing it to fall 500 times, then to a height of ½ in. with 500 repetitions, then ⅜ in. more in height, and so on until the slab failed. To date, about twelve slabs have been tested, laid on a rather wet subgrade. A surprising difference has been found in the strength of the different types of pavements tested. The total number of blows required to cause failure have varied with the different slabs from sixty-seven up to almost 2,000.



Views of some of the interior mechanism of the Electrion, showing the fan, the magneto, the electric governor and the fuel tank



The battery of the Electrion is enclosed within a neat appearing cabinet

A Department of BETTER BUSINESS

Conducted by Ray W. Sherman

Here's What They Say! What Do You Say?

IN a recent issue of Motor Age the Department of Better Business asked some "What Do You Say?" questions, inquiring as to what answers the able salesmen made when prospects entered their various objections—which is a habit prospects have. And in answer to the "What Do You Say?" have come some good answers. Let's have some more. Maybe your idea will help the other fellow the same as his ideas on this page may help you.

She's Good Enough

"When he says the old car is good enough," what do I say? Why, my dear man, that's the very foundation on which the whole automobile industry has been built. Don't you know that every owner feels the same way about it? It makes no difference what kind of an old boat he has "she's a good runner and a good old car." Every owner is and has been a booster. But when you drive this new car, you will soon notice that it is no longer necessary to put your hand down in your pocket or tinker up your car a day ahead when you want to take a drive. —Edward B. Roemer, Valley Motor Co., Zanesville, Ohio.

But, My Wife—

If he says he'll have to see his wife, get acquainted with the wife at once, take up an enclosed model for your demonstrator and have it polished like a nigger's heel.—W. R. Reinhardt, Spokane.

Car Is No Good

If he says your car is no good, and you happen to be selling a Ford, figure out for him the interest, tires, insurance, license, and overhead and ask him if that saving is not worth anything to him. Show him the turning in value on depreciation. If it is a $1500 car, show this same argument against a $2500 car, and the added advantages over the lower priced car. If a $3000 car, you will similarly have to know every detail of advantage over your competitors.—W. R. Reinhardt, Spokane.

Old Car Good Enough

If he says the old car is good enough, ask him if he would like to live in a cave like our forefathers, or if he prefers electric lights to oil lamps. Remind him that life is short and today should be the greatest day of our lives. Progress and environment are the watchwords and any old thing being good enough means stagnation and degeneration.—W. R. Reinhardt, Spokane.

What Do You Say?

When a customer says your shop charges are high, what do you say?

When he says you spent more time than was necessary on some repair job, what do you say?

When he says the job you did wasn't done at all, what do you say?

When he says all dealers and garagemen are thieves and robbers and not to be trusted, what do you say?

When he says you made a promise and didn't keep it, what do you say?

When he says he's never coming back to you again, what do you say?

For acceptable answers to these questions, or for any other good ideas for this department, Motor Age will pay One Dollar per idea.

Not Enough Money

If a prospect should say to me that he hasn't money enough to buy a car, I would draw his attention to the fact that the reason some people have money and others not is mostly because of efficiency. If he has use for a car in his business, even only to the extent of going to and from his work, the advantages can be shown as many. On the other hand, if he should have use of a car only for recreation purposes this too can be shown to his benefit and welfare. In short "Efficiency" is the fundamental line of attack and it is to his interest to go into his affairs and make definite arrangements eventually to own a car.—W. R. Reinhardt, Marshall-Wells Co., Spokane.

Keep the Walls Clean

Attention to the small details often differentiates the successful dealer from one of the unsuccessful type. A Cincinnati firm which desires to keep the light colored walls and hangings of its salesrooms spotless prevents the exhaust gases of automobiles from discoloring the walls by the simple use of a newspaper. The paper is held over the exhaust pipe when a car is driven from the salesroom floor.

Sell the Truck

Here's another one of those good circular letters sent to the truck prospect list by George W. Tremain, sales manager of the Tremain Motor Co., Fort Dodge, Iowa, selling the Republic truck:

The letter:

Can you afford to wait until the railroad or the drayman delivers your goods?

In these days when rapid turnover of invested capital is a prime factor in business success, the motor truck has become indispensable in many progressive business establishments.

The Republic has been "delivering the goods" for years. It is the product of motor truck builders who have searched every possible field for ideas in design and methods of construction aimed to produce a unit of transportation which is dependable, long-lived and economical in operation. How successful this search has been is attested by thousands of satisfied REPUBLIC owners.

We should like to have you know more about the REPUBLIC. Will you let us tell you about a model designed to fit the needs of your business?

The Fable of the Champion Cow Milker

ONCE upon a time, years and years ago, in a beautiful country where the sun always shone and it never was too hot or too cold, lived a man who was known for miles around as the fastest cow milker that had ever lived in those parts.

The Cow Milker would sit down at a cow and milk so fast that the spuzz-spuzz of the milk streams in the pail were one continuous spuzz, and the streams so fast they were one stream.

His manner with cows was such that every cow in the country would rather be milked by the Cow Milker than by any other person. So well did the cows like the Cow Milker that they always gave down more milk for him.

The result was that his cows always gave more milk than any other cows. He waxed rich and fat and become one of the biggest and most renowned men in his beautiful country.

But there was an odd thing about the Cow Milker. He always used a one-legged milk stool. He put one leg on in the beginning because the wood in the stool was hard and putting on other legs was quite a bit of trouble. So he put on just one leg and let it go at that.

After using the one-legged stool for a while he contended that a one-legged stool was by far the best type made. He said it enabled him to get a certain weave and motion to his body as he milked, which helped him concentrate on his milking, and he gradually came to regard his one-legged stool almost with affection.

Folks said the one leg might give out some day, but he said he would handle that problem when it came. Meantime, he would prosper at his milking on the one-legged stool.

But one day, after years of use, the leg cracked, and then as he was milking his cows the one leg collapsed and so frightened the cows that some of them even refused at first to let the Cow Milker approach them, and more than ever. He even lost some of his

He hurriedly put a new leg in the stool, but the wood was not so good and it, too, cracked. The troubles with the one leg upset the cows and the man's fortune began to wane. Try as he would he could not bring his cows back to their former productivity—although they ate more than ever. He even lost some of his skill, so that the separate spuzzes of the milk could be distinguished with ease and it worried him greatly.

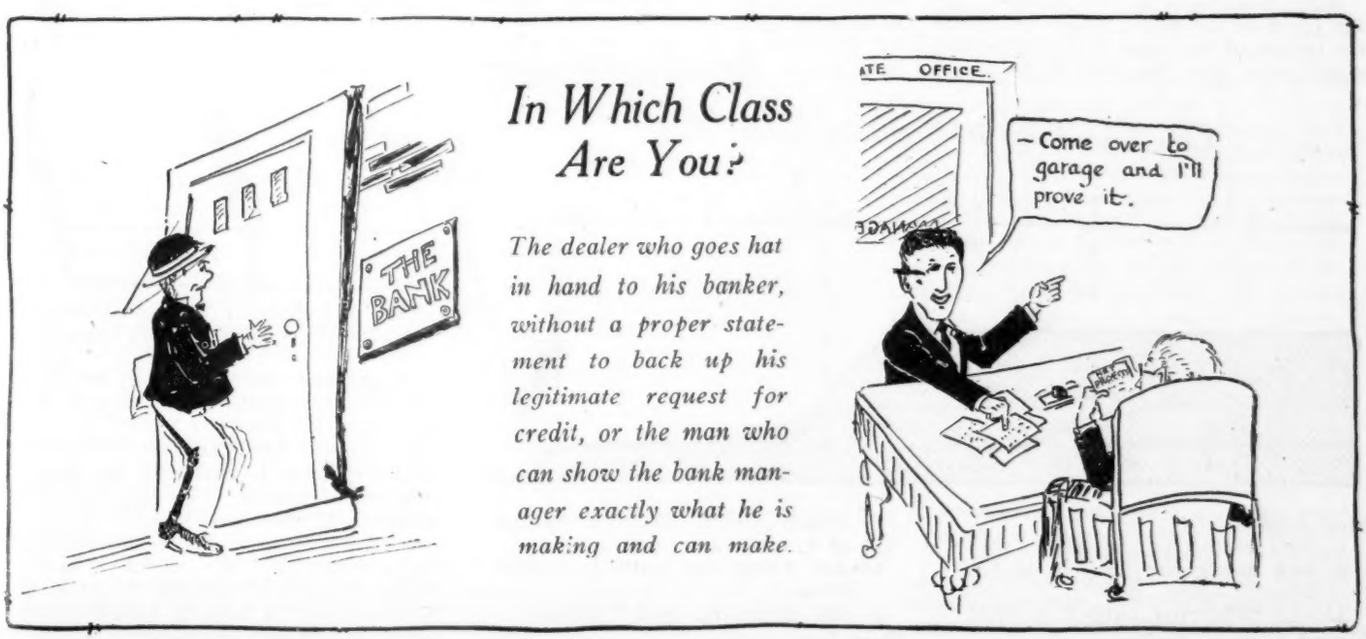
THEN one day there came to him a fairy—for there were fairies in those days—and the fairy said: "What you need is a milk stool with not less than three legs. When the All-Wise-One made the world he put not less than two legs on every living thing. The only one-legged thing he made was the tree, which is rooted motionless in the earth. Nothing with one leg can ever be sound and stable. You should have heeded the advice of your neighbors years ago. Your idea that you can milk better on a one-legged stool is mostly a false notion on your part."

So the man made a three-legged stool and soon found he could milk as well as ever, and he got his skill and the goodwill of his cows and lived to great prosperity and old age.

MORAL: A one-legged business may prosper exceedingly, but a department of accessories, or a paying repairshop or service station, or any other automotive department which keeps the cash register tinkling, is a comfortable thing to fall back on when the car or truck department is adversely affected.

Is He Right?

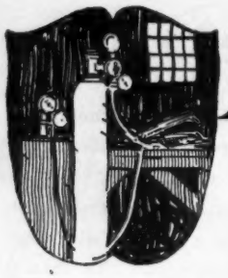
What will sell a car depends on how badly you really want to sell it. If you want to sell the car as a drowning man wishes to live, you will sell it.—W. R. Reinhardt, Marshall-Wells Co., Spokane.



In Which Class Are You?

The dealer who goes hat in hand to his banker, without a proper statement to back up his legitimate request for credit, or the man who can show the bank manager exactly what he is making and can make.

From the Willys-Overland Starter



Autogenous Welding

What it is and how it is applied

THIS is the thirteenth of a series of articles on autogenous welding. These articles are intended to be of aid to the man who must learn the art of welding with little or no personal instruction. They also are intended as a reference for the man attending a welding school. It is likely that during the first few months of his instruction many problems will come up that may be solved more readily with these articles on hand.

Finally, this series should be of benefit to any automotive service man or repairman, even though he never intends to have a welding torch in the shop. The reading of these articles will give him an understanding of the subject which should greatly aid him in general repair work. He will be better able to decide, when he has a part to repair, whether it is feasible or not to weld it, and if so, if it will pay. The more familiar one becomes with this art, the wider the scope of its application. The man who is versed in the art will find many clever applications that one who is less familiar with the subject would never dream of. An understanding of welding principles offers a new technique to the repair man.

Part XIII—Welding of Plates at Angles

THE welding of plates thicker than ¼ in. is done in a slightly different manner than that employed for the thinner ones. The difference lies mainly in the procedure in adding the filling rod, Fig. 36.

Consider two steel plates ⅜ in. thick beveled to an angle of 45 deg.

After placing the plates together at the proper angle, melt the edges of the bottom of the V together for a length of 1 in. Add the welding rod to this length until the V is about half filled. Be sure that the sides of the V are melted when the rod is added. Then go back over this short section and fill up the V until it is 3/32 in. thicker than the original plates.

When this length of weld is done, melt the edges of the plates ahead down into the bottom of the V and at the same time make sure that the end of the weld already finished is still melted and flows into the bottom of the V. Then add to this next section metal until a reinforcement of 3/32 greater than the thickness of the plate is formed. Repeat this process the full length of the seam.

Near the finish of the weld it is necessary to give the rod a slight swinging motion similar to the blowpipe in order that the top of the V be entirely covered.

WELDING PLATES ½ IN. THICK

The welding of ½ in. plates is accomplished in a similar manner to that used in welding ⅜ in. plates with this difference, that at the top or finish of the weld it is necessary to swing the blowpipe and welding rod with a little wider motion in order to cover the greater width of the V. Care should be taken that each addition of the welding rod is on molten metal, and that the bottom of the V is melted together thoroughly before any welding rod is added. The thicker the metal the greater the possibility of an unsound weld. Never go over a weld without adding filling rod.

WELDING HEAVY STEEL PLATES

Plates of about 1 in. in thickness or heavier should be welded on both sides and consequently should be beveled on both sides, Fig. 37. One side is welded in the manner described for ½ in. plates and then the work is turned over and the other side similarly treated.

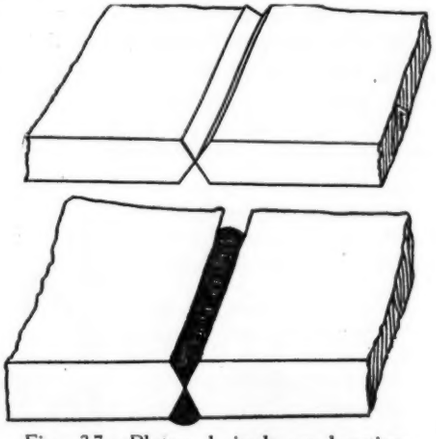


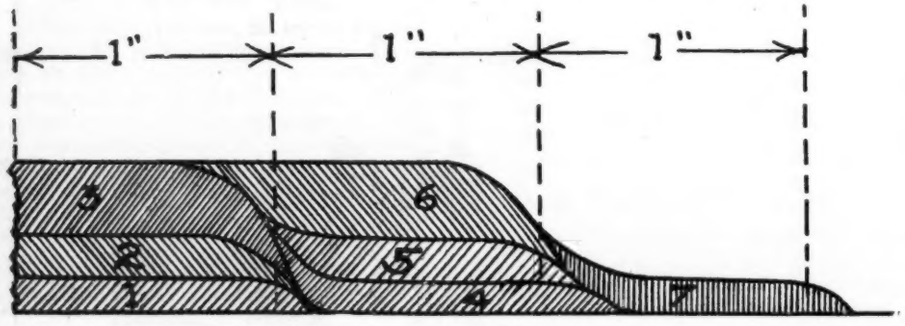
Fig. 37—Plates 1 inch or heavier must be welded on both sides

A welding head suitable for 1 in. material should be used and the oxygen pressure regulated to correspond. The welding rod should be ¼ in.

Weld one side exactly as described in the previous problem except that the excess of metal should amount to ⅛ in. When one side is finished, turn the piece over and complete the other.

Be sure that the bottom of the V of

Fig. 36—Steps in Welding ⅜-in. Plates



First Inch—
1—Melt bottom of the V.
2—Add filling rod until V is half filled.
3—Add filling rod until V is filled.
Second Inch—
4—Melt down edge of metal previously added and melt bottom of V.
5—Add filling rod until V is half filled.
6—Add filling rod until V is filled.
Third Inch—
7—Proceed as in 4.

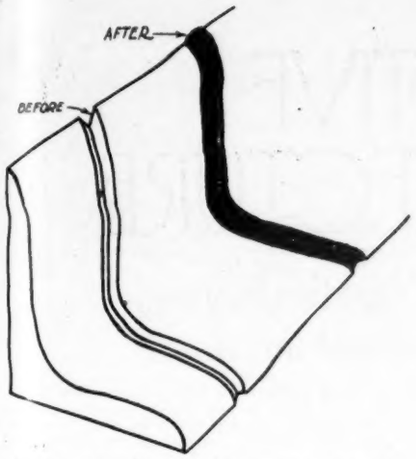


Fig. 38—The welding of an angle iron calls for vertical and horizontal welding

the second side is thoroughly melted in order that it will meet the bottom of the weld of the first side. This point is very important.

When the first side is completed and turned over, take the welding rod and scrape off any scale that has been formed during welding.

SIMPLE VERTICAL WELDING

Take two pieces of 3 by 3 by ¼ in. angle iron, beveling the edges at an angle of 45 deg., Fig. 38.

Begin the weld at the lower end of the vertical flange and work upward. In vertical welding the flame is given a little different swinging motion than in horizontal welding and the rod is handled differently. The rod is held in the middle of the V and the flame is moved by a swinging motion from side to side without touching it. The rod should be placed in the V about ⅛ in. ahead of the flame. The blowpipe should be held at right angles to the surface of the flange.

When the metal at the bottom of the the V has become melted the blowpipe should swing upwards around the end of the rod. This will melt the rod and the middle of the V. The blowpipe is then swung down under the rod with the result that the molten metal will flow into the V.

The flame should not be held too long in one place or a hole may be burned in the metal.

The metal must not be overheated or it will run too freely.

The welding of two angles cut so as to form a right angle is similar in every respect to the process just described, Fig. 39.

OVERHEAD WELDING

Two pieces of channel iron with the bevel on the inside offer a problem in overhead welding, assuming for the sake of the problem that the pieces cannot be turned.

The two pieces of channel iron are placed on the edge of the welding table with the channel web in a vertical position. The lower flange and the web are welded as previously described.

The top flange is to be welded from the inside. In order to do this it will be necessary to work from underneath. Welding of this nature is called overhead welding. It is carried out the same as vertical welding except that greater care must be taken that the metal will not run out when melted. To prevent this the metal should not be melted any more than necessary and blowpipe and welding rod must be handled carefully.

Fig. 41 shows a channel welded from the outside. The process is similar to that just described.

(To be continued)

Ford Technical School Ready to Be Opened Middle of Month

Detroit, Oct. 9—The Ford Technical School will be opened about Oct. 15 with classes in the present school building at the Highland Park plant. The work for the first year of the four years course will be the same for all students who will alternate weekly in class room and shop.

The company announces that the new students will receive compensation at the rate of 40 cents an hour, for both shop and class work. The class work will be forty-two hours and the shop week forty-eight hours.

After the first year the students will choose their own courses. It is announced that the Ford Motor Co. assumes no obligations toward the student after graduation nor is the graduate in any way obligated to the company.

Requirements for admission call for the equivalent of a high school education and all applicants must be at least eighteen years of age. Applications from thirty states have reached the company since the announcement of the opening of the institution.

Chicago, Oct. 9—The Automobile Continuation School, a public school operated by the Chicago board of education and the only public school in the city where part time courses in automobile mechanics is offered during the day, started Oct. 4.

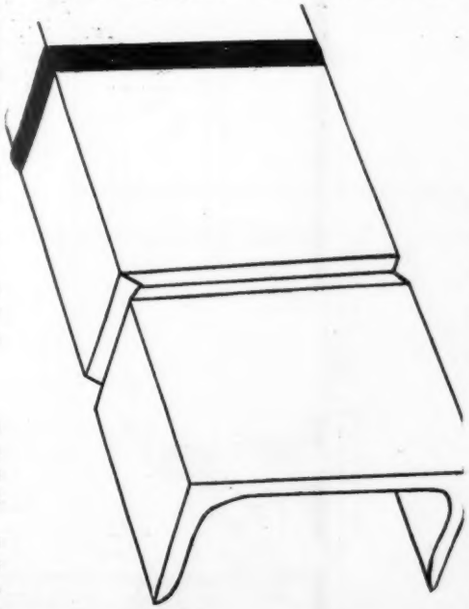


Fig. 41—Channel welded from outside

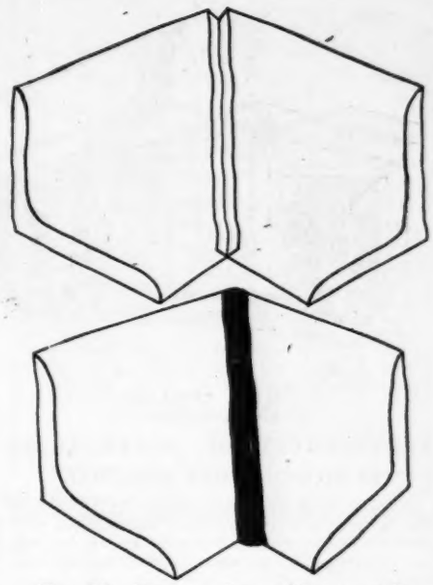


Fig. 39—Two angles welded at right angles

The men spend two half days a week in the school, the hours of instruction being from 1 p. m. to 5 p. m. Mondays and Wednesdays. Special features are being offered from time to time. On Oct. 4 there started a course in electric measurements as applied to the electric vehicle industry.

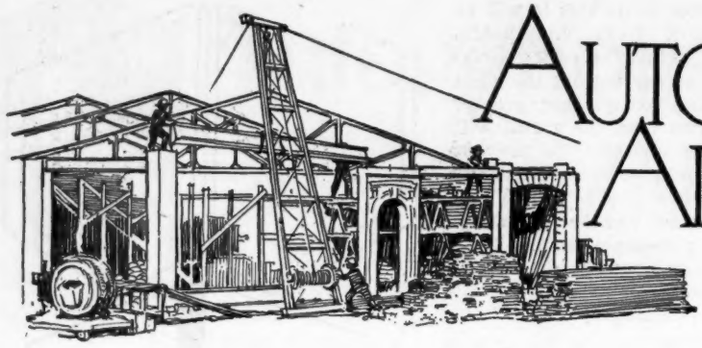
Expert mechanics who are also experienced teachers are in charge of the work. The school is open to drivers, mechanics, garage employees, battery manufacturing employees, owners of cars and others interested in the manufacture or operation of electric vehciles.

New York, Oct. 9—Cooper Union has announced a course in motor vehicle engineering planned for those persons who are engaged during the day in automobile design, construction, testing, drafting or repair work or in some branches of engineering and who wish to obtain a technical knowledge of motor vehicle design and testing.

The course includes class room work where instruction in the principal parts of motor vehicles and the theory underlying their proper design and construction will be given. The laboratory work will consist of the study of the operation of engines and the various causes affecting the indicator diagram. The testing of engine power, the study of magnetos, efficiency of transmissions, differentials, bearings and other parts of motor vehicles will also be included.

TALK OVER SALES POLICIES

Cudahy, Wis., Oct. 8—Sales policies for 1921 and problems confronting the automobile tire industry and automotive industry in general were discussed at the annual sales convention of salesmen and warehouse managers of the Federal Rubber Co. here. The convention brought together the 150 sales representatives and managers who represent the Federal company's contact with the public.



AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER

In this department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping service stations, garages, dealers' establishments, shops, filling stations, and in fact any buildings necessary to automotive activity

When making requests for asistance please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

No. 276

ARRANGEMENT OF DEPARTMENTS IN THREE-STORY BUILDING

Please furnish plans and specifications for a modern up-to-date salesroom and service station on a lot size 66 ft. by 132 ft., frontage to be on a street facing the east.

Would like to have showroom, offices, parts room and service room on the first floor; second story to be used for live storage and the third floor for dead storage.—J. G. Myers, Champaign, Ill.

We would prefer to have you place your service department on the second or third floor in order to get better light and freedom from interruption which the upper floor affords. You will also save considerably on elevator service by having part of your live storage on the ground floor.

If you want the columns on the top floor eliminated, this can be done, though for dead storage there is no object in going to the expense of trussing the roof.

The open space in the center of the main floor is very advantageous for making inspections and slight adjustments. The liberal proportions of the exit give room for gasoline and oil service without obstructing the passage.

If you are always assured of light around the shop, that is, if there are alleys on both sides wide enough to let in the light and no high buildings liable to be built on the other side of them, then the first floor would not be unsuitable for the shop, but under the very best conditions, it would not be as good as an upper floor.

MOTOR AGE does not furnish specifications for buildings, but judging from other buildings recently constructed, it would cost between $90,000 and $100,000. While we try to make our plans in such a way that they are practical to follow in construction, they are intended to give you an idea of arrangement, chiefly. You will need the services of an architect or an experienced builder in putting up a building of this kind, and he can furnish your specifications.

No. 277

MACHINERY ARRANGEMENT FOR FORD SERVICE STATION

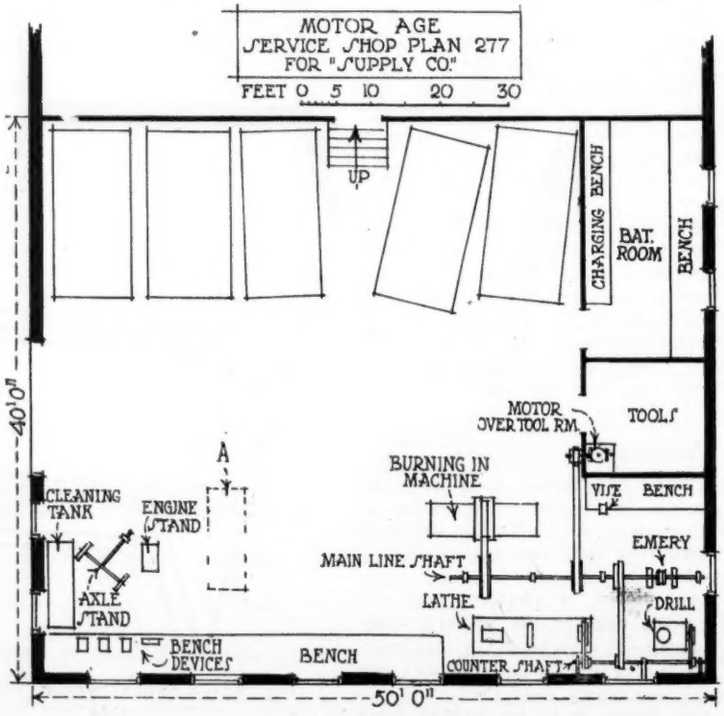
We would like your suggestions on an up-to-date layout for a Ford service station which one of our customers is planning to build. He expects to install a line shaft from which to run a drill press, a grinder, a lathe and also a burning-in machine to be run either from the same line shaft or from another line shaft in conjunction with a 15 hp. motor. He also wishes to put in an axle stand and an engine stand suitable for Ford work, a battery bench, suitable for battery work, and a charging outfit.—Supply Company.

Your customer's shop is large enough but of a shape difficult to utilize to the best advantage. If it were longer and narrower, the machines and equipment could be placed at the far end where they would be centralized and entirely out of the way of the cars.

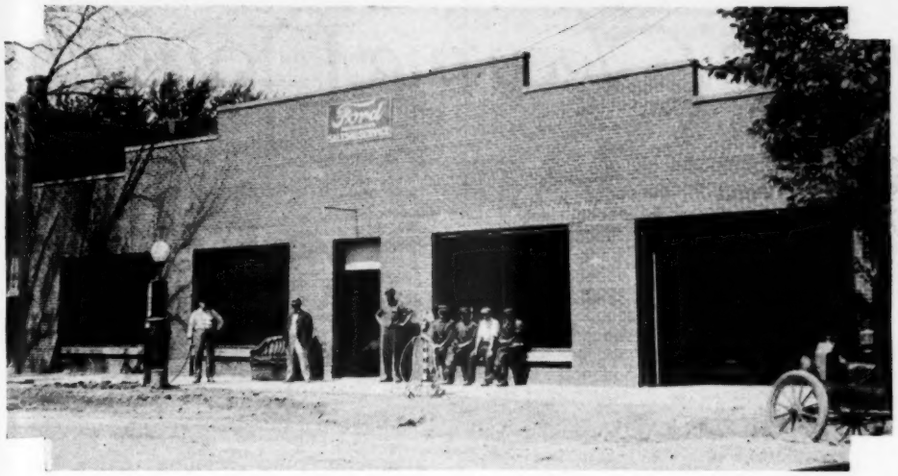
The layout we show gives the lathe, grinder and drill press good, light positions with a minimum amount of shafting necessary. If the burning-in machine has a separate motor it would be best to mount it directly on the machine which could then be moved when desired. The position at "A", near the engine stand, might be preferred in order that a workman could watch the burning-in process while he assembled or diassembled another engine.

The burning-in machine could also be driven from the main shaft in case it has not an individual motor.

Some small bench devices for use in connection with engine overhauling will be needed and should be placed about as indicated.



No. 277



FORD
Sales and Service
W. G. Carpenter, Burlington, Mo.

Motor Age, Chicago, Ill:

We followed your plans for the interior to the letter with a room 100 ft. deep by 75 ft. wide with self-supporting roof built on piers and of poured cement.

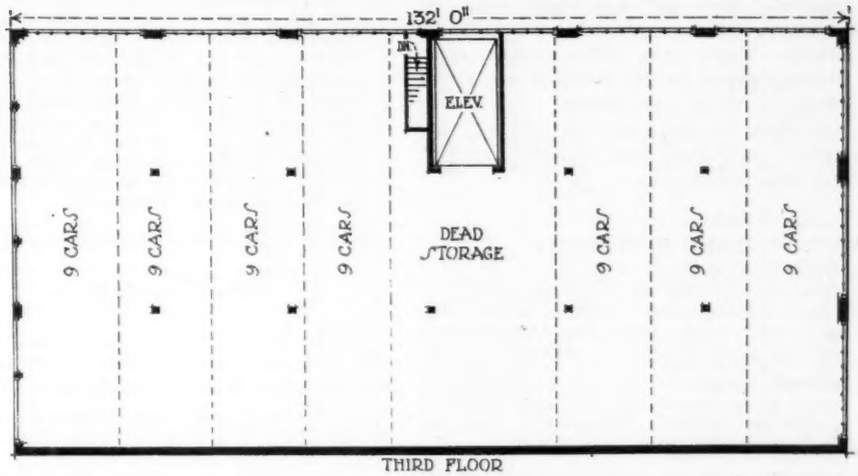
Am enclosing picture. I am waiting for paving to be finished. The city is paving in front of the building and it is so littered up I cannot get a good picture. However I am mailing you a small picture which you can use. The plan is exceptionally good and is convenient and saves room.

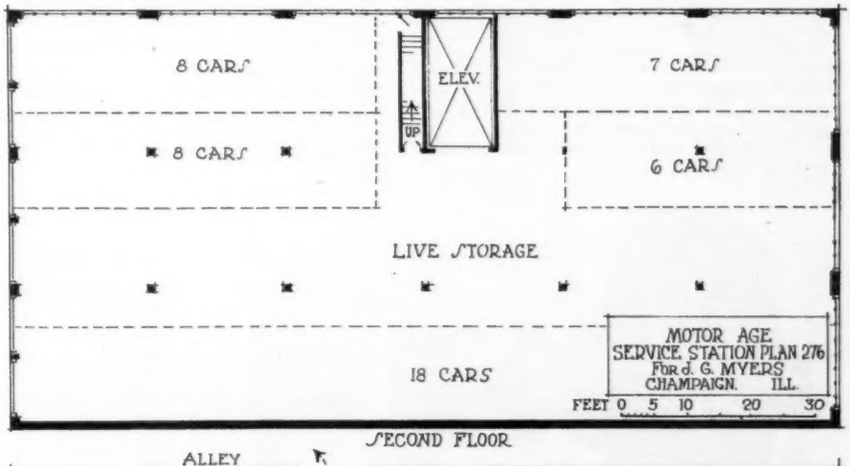
I asked Motor Age for this plan because I knew they would have the benefit of everybody's experience in the garage building line and am well satisfied with this plan. Everybody who looks at this building thinks it an ideal arrangement for this business.

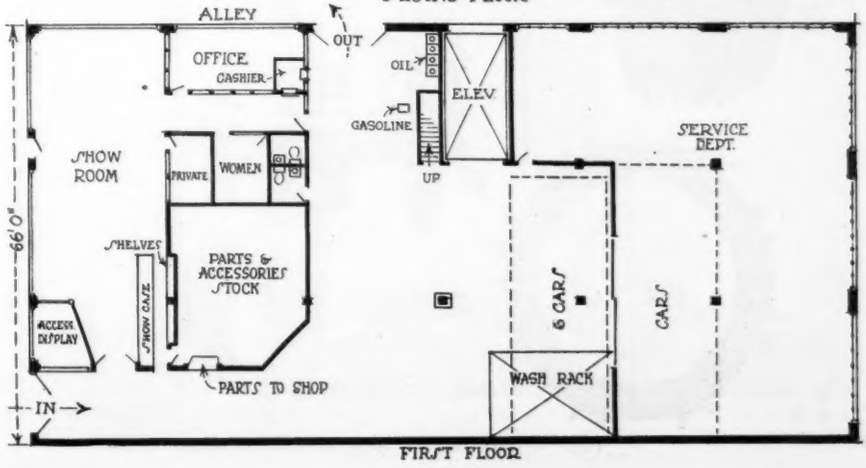
Yours Respectfully,
W. G. CARPENTER.

Above is shown the Ford sales and service station of W. G. Carpenter, Burlington Jct., Mo., which was built in accordance with plans furnished by Motor Age. Simplicity and economy of design has been the whole thought in laying out this building together with arrangement for greatest efficiency.

This is a service Motor Age renders to its readers without charge that they may have the benefit of collected thought and study of this subject. Motor Age will be pleased to solve your problems of construction whether it be the question of what material to use for floors or a blue print of the entire layout.







NEW PLANT FOR SCRIPPS-BOOTH

Detroit, Mich., Oct. 8—Plans for an assembling plant to cost a million dollars have been drawn by architects for the Scripps-Booth Corp. in Oakland, Calif. A site has been purchased opposite the Chevrolet branch in Oakland and work on factory construction will begin early in the spring. The initial unit will have 200,000 sq. ft. floor space. An L shape of brick and concrete will permit of an additional wing as rapidly as demand calls for. Construction will be completed and the plant will be in operation by July.

ENJOINS FIRM IN PATENT SUIT

New York, Oct. 8—Judge Hand in the United States District Court here has issued a decree of perpetual injunction against the Automotive Specialties Corp. restraining them from the manufacture or sale, directly or indirectly, of ignition mechanism, or parts therefor, covered by the Connecticut Telephone & Electric Co.'s patents, No. 1029914, No. 1113850, and No. 1204104.

SALES INVENTORY DISCUSSED

Indianapolis, Oct. 8—Oakland dealers from all over Indiana attended a conference held here by the Oakland Motor Car Co. at which sales inventory was the chief topic of discussion. L. S. Shoup, state manager for the company presided at the banquet in connection with the conference. Officers in attendance were W. H. Masten, assistant general manager of Pontiac, Mich., and William N. Albee, Detroit, president of the W. N. Albee Co., sales counsel.

The Readers' Clearing House

Questions and Answers

CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age.

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

GASOLINE CONSUMPTION

Q—What would be a conservative rating of miles per gallon of gasoline for the 1919 Mercer, Series 4, 1919 Stutz and 1919 Marmon 34, under average touring conditions?

2—Is the transmission of the 1919 Mercer, Series 4, planetary?—L. B. Ockert, Roseville, Ill.

1—A rating of miles per gallon of gasoline for the cars mentioned is something that cannot be stated definitely. These cars, under average conditions, ought to get from 11 or 12 to about 15 miles per gallon.

2—This transmission is of the selective type with four speeds forward and one reverse.

FORD REBUILDING

Q—I contemplate overhauling a Ford engine using new cylinder block on account of one scored cylinder in the old block as well as installing light-weight pistons, counterbalanced crankshaft and new ignition system. In using light-weight pistons such as Clark-Turner would it be an added advantage to have a counterbalanced crankshaft? Would Dunn counterbalances be satisfactory for use with light-weight pistons or are they designed for use with regular Ford pistons? Should light connecting rods be substituted in place of regular Ford rods?

2—Would you recommend battery ignition such as Atwater-Kent or high-tension magneto?

3—Do you think the changes mentioned will produce a smooth running and more powerful engine?—C. F. Springsted. Claremont, Minn.

Miscellaneous

1—The installation of counterbalances will aid greatly in reducing vibration and since you intend to make a complete overhauling we advise making the installation. The counterbalances mentioned are not designed especially for the Ford pistons but are applicable when any kind of pistons are used. They do not attempt to correct the balance of the reciprocating parts but they do correct the rotative unbalance of the shaft. Since you intend to install light pistons it would be advisable to use light connecting rods as well.

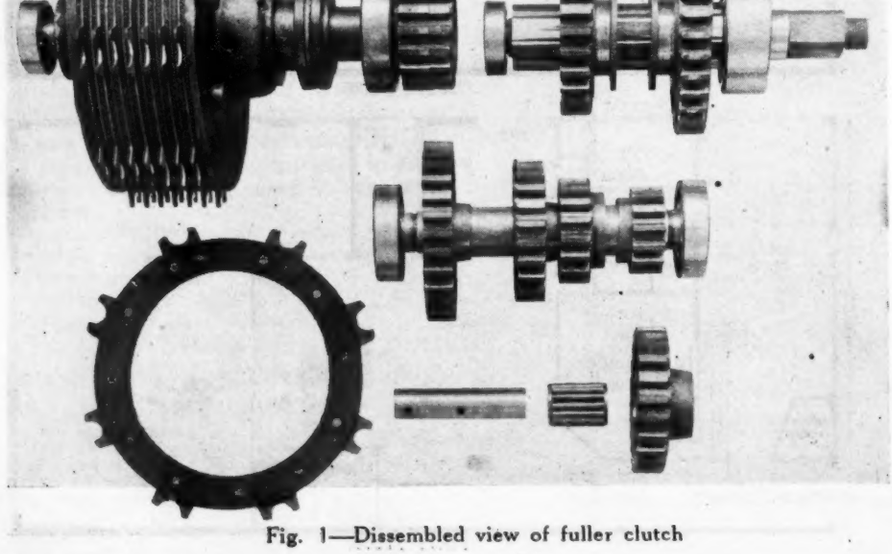


Fig. 1—Dissembled view of fuller clutch

2—We are not in a position to recommend any particular type of igition. Both battery and magneto systems have their advantages and you will have to make your choice by comparing the two systems.

3—The changes mentioned ought to give a smoother running engine and a higher engine speed will be obtained which means that the engine will be more powerful.

FULLER CLUTCH ADJUSTMENT

Q—Publish illustration and give adjustment of the Fuller clutch.

2—How long has the Republic Motor Co. used the Fuller clutch?—John T. Rosa, Detroit.

1—A view of the Fuller clutch parts is shown in Fig. 1. While this illustration shows a part of the transmission also, the clutch is admirably illustrated. This type of clutch has no adjustment. The great amount of wearing surface makes it long lived and what little wear does occur is taken up by the spring.

2—This we can not say.

WHEELS OUT OF LINE

Q—If the spokes in the rear wheel of an automobile are broken causing the wheel to wabble, will it have any effect on the tires? If so to what extent and why?—R. E. Cooper, Kansas City, Mo.

A wabbling wheel will cause the tire to wear in spots. If the tire is running out of line it will have the same effect as if the tire scraped sideways. Furthermore, if the wheel is out of line it will cause undue strain on the entire rear axle assembly. The brake action will be poor and this combined with the broken spokes will make driving rather unsafe.

WOODS MAGNETO CLUTCH

Q—What is the voltage used in the magnetic clutch of the Woods dual electric car? The engine used has a name plate marked "Westinghouse Rotary Valve Motor."—R. B. Rodgers, Van Nuys, C. I.

The magnetic clutch used on this car was made by the Cutler Hammer Mfg. Co., Milwaukee, Wis., and was rated at 100 volts, 40 cells, Exide battery used.

AVERY CLUTCH ARM

Q—The clutch arms on an Avery 12-25 tractor have been giving trouble. Sometimes one breaks and again two break. What is the reason for this?—Oscar Shilts, Gibson City, Ill.

1—The breakage of clutch arm on an Avery 12-25 tractor is occasioned by the babbitt in the crank shaft pinion becoming worn due to lack of lubrication. As this pinion revolves with the shaft when a tractor is in gear, a great many operators fail to appreciate that it needs lubrication just the same as the rolling pro-

cess forces the oil out of the bearing very quickly. As soon as this shaft has play it causes the band wheel to wobble, and being in turn bolted to the band wheel it causes the band wheel to wobble. The clutch spider being keyed to the shaft carries the clutch arms on pins which fit the hole in the clutch arms very closely.

Now, then, if the engine turns over with the babbitt worn, the pinion wobbles, the rim of the wheel wobbles and consequently a lateral strain is brought to bear on the clutch arms which results in a break. The arms are amply strong to carry any load that is possible to put on the engine but they are not strong enough to stand the side pressure which is caused under the above conditions. If two of the arms are adjusted with more pressure than the third one, the two tight ones will break whereas if only one arm is tighter than the two, one arm will break. The answer is to have the pinions rebabbited and bored to fit the shaft and supply sufficient lubrication from that time on.

WHEEL CAMBER

Q—How much dish should a 26 by 6 wheel have?—F. P. Bright, Wilmington, Ohio.

1—Dish refers to the way in which the spokes are set and we do not believe this is what you want. If it is camber you refer to, it means that the wheels are closer at the bottom than at the top. The camber should be about 2 deg. or about 1 7/32 in.

GASOLINE TANK LOCATION

Q—There is a prevailing opinion here that the petrol tank in Overland 4 situated as it is under the dash is rather dangerous as it is very close to the engine. Can another tank be fitted under the front seat? If so can petrol be supplied to the engine from the tank. I am of the opinion that if the petrol tank be shifted to some other place there will be a greater demand for the Overland 4 here?—P. Ratnavelu Tevar, Trichinopoly.

If you intend making any changes in the location of the tank we advise placing it in the rear and using the vacuum system. It is true that a gasoline tank located under the cowl is a fire hazard. However there is not very much danger as long as the tank is of the proper construction and the electrical connections correctly made.

One of our leading cars is using a gasoline tank under the cowl and still it is classed very favorably in insurance rating. In the case of a collision it is evident that the fire hazard will be great but we do not believe the location of the tank will have anything to do with the sales possibilities of the car.

NOISY TIMING GEARS

Q—When running a 1918 Buick model 1-45 over 20 m.p.h. the timing gears are very noisy even when idling the engine. The car has been driven about 6000 miles. How can this noise be eliminated? Have been told that this is a general complaint. Would you advise fibre gears? If so, where could they be obtained and what would be the approximate cost?

2—What is the maximum speed of the Buick model 1-45?—E. Byars, Mt. Clemens, Mich.

1—If the timing gears are noisy there is but one thing to do and that is to install a new set of gears and the front main crankshaft and camshaft bearings.

TO assist readers in obtaining as a unit all information on a certain subject, MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

Miscellaneous

L. B. Ockert.....Roseville, Ill.
E. F. Springsted.....Claremont, Minn.
John T. Rose.....Detroit
R. E. Cooper.....Kansas City
R. B. Rogers.....Van Nuys, Calif.
Oscar Shilts.....Gibson City, Ill.
F. P. Bright.....Wilmington, Ohio
P. Ratnavelu .....Tevar Trichinopoly
E. Byars.....Mt. Clemens, Mich.
Joseph Farrelly.....New Rochelle, N. Y.
Case Auto Repair Co.....Hartford, Conn.

Engines

C. L. Blay.....Waltham, Mass.
Jos. Poettgen & Son.....Freeburg, Mo.
L. B. Ockert.....Roseville, Ill.
F .O. Kennett.....Albers, Ill.
Alexander Henderson .....
....Chestnut Hill, Mass.
Bryan Redemus .....Ashkum, Ill.
Holger Grundfor.....Pocatello, Idaho
E. Rosingana.....McAlister, Okla.
B. F. Schofield.....Providence, R. I.

Electrical Systems

Albert L. Reda.....Chicago
Holger Grundfor.....Pocatello, Idaho
Maurice P. Bonvallet.....Wichert, Ill.
J. A. Schramm.....Portsmouth, Ohio

One of the managers of a large Buick service station informed us that in many cases the noise was due to a slightly worn front main bearing which allowed the crankshaft to raise slightly and forced the gears into too tight a mesh.

Due to the fact that the timing gears are incased in a separate housing and depend upon a supply of heavy oil for lubrication it is very essential to watch the lubrication carefully. We do not know whether the use of fibre gears would prevent the noise or not.

The advisable thing is to purchase a new set of gears from the Buick company and install them.

2—This car ought to make in the neighborhood of 55 to 60 m. p. h.

MARVEL CARBURETER

Q—What carbureter would give the greatest gasoline mileage on a 1918 Buick model E-45?—E. Byars, Mt. Clemens, Mich.

This is a question that is practically unanswerable. The car is equipped with a Marvel carbureter and there is no reason why it is not possible to set this carbureter so as to obtain very good mileage.

Under average summer conditions with a careful setting of the carbureter that will cause popping until the engine is warm and also upon quick pick up it is possible to obtain about twenty miles per gallon. With a setting of this kind there will be a slight sacrifice of power and speed but it will allow a speed of about 50 m. p. h.

ADJUSTMENT FOR BETTER OPERATION

Q—Explain how to get the greatest possible speed, compatible with satisfactory driving at lower speeds, from a 1913 4-cylinder Buick roadster.—Joseph Farrelly, New Rochelle, N. Y.

In this case the only advisable thing to do is to leave the timing and construction of the engine as it is but put everything in perfect condition. A complete overhauling of the car ought to put it in pretty good shape.

Due to the fact that the car is an old model there may be some difficulty with carburetion. The installation of a hot spot will aid greatly in the cars performance particularly at low speeds and will enable you to get better operation during cold weather. With the car in good condition you ought to get at least 50 miles per hour.

WHITE TRUCK CLUTCH

Q—Publish illustration of the clutch used on the 1920 5-ton White truck.—Case Auto Repair Co., Hartford, Conn.

The complete clutch and pedal assembly is shown in Fig. 2.

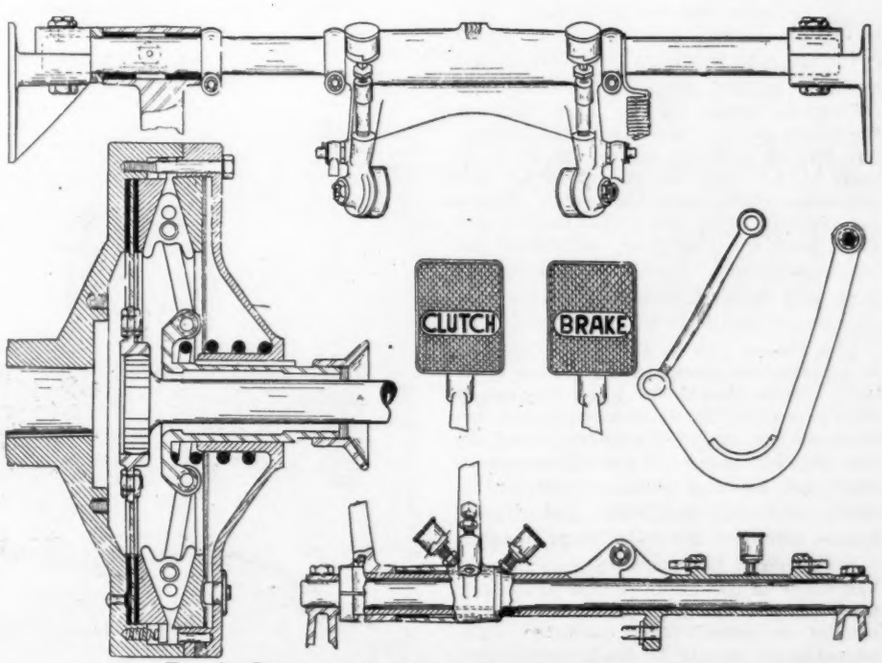


Fig. 2—Diagram of white truck and pedal assembly

ENGINES

HUDSON VALVE ADJUSTMENT

Q—Illustrate and give exact valve clearance on valve adjustment of a 1919 Hudson Super Six, model M, when engine is cold.

2—When driving along with gas shut off and allowing the car to coast using engine as brake, there is a back lash somewhere between engine and differential as soon as an attempt is made to make the engine pick up again. This results in a great deal of wear. Illustrate and give adjustment on bearings of transmission and differential. The bearing should not be adjusted too tightly as I do not think play is in the universal joint. Do you think it could be play in transmission or differential bearing?—C. L. Blay, Waltham, Mass.

1—Valve adjustments should not be made when the engine is cold. Fig. 4 shows the method of adjusting the valves very clearly and proper clearances are indicated.

2—If there is a condition of back lash which is causing trouble it is very probable that all of the parts from the engine to the rear axle are contributing. It seems rather unreasonable that there is no noise with a condition as you have described it. Examine and adjust the clutch so you are sure it is not slipping. Examine the universal joints and check up the adjustment of the rear axle assembly. This may be done as follows:

Before attempting to make any adjustments, remove the inspection plug at the left side of gear set and differential carrier. See Fig. 3. See that the back face of the teeth on both pinion and ring gear are flush. The pinion adjustment may be reached by first removing the pinion adjustment lock held in place by two bolts on the top of the carrier, as shown in the small cut in rear axle illustration.

End play in the pinion shaft should be taken up by turning the front bearing adjustment toward the left (when looking at the axle from the front end). This is the inner nut. The outer nut, which is for the rear bearing adjustment, should be held against movement during this operation. Take up the play between the bearings until there is no end motion, but do not bind or cause the shaft to turn hard. Line up the slots in both adjusting nuts, then turn both toward the right to bring the pinion deeper into mesh with the ring gear, or toward the left to withdraw. The proper amount of back lash between the teeth of the ring gear and pinion is from .006 in. to .008 in.

The grease cup on the pinion housing is intended to lubricate the pinion bearings. This should be filled frequently with grease. (The Hudson company recommend the use of Whitmore Anti-Friction No. 5 grease.) It should always be examined when a pinion adjustment is made and an additional quantity of grease added at the adjustment opening.

If the pinion is flush with the ring gear and there is too much or too little lash, the ring gear may be adjusted either in or out to remedy this condition. The adjustments should be made as follows:

Remove the differential cover plate on the rear of the axle housing. Take off the differential bearing adjustment locks. Back off the bolts slightly holding the bearing caps in place, so that the adjusting nut can be turned easily. Loosen only a very little as the threads in these caps will become cross threaded if the bolts are backed out too much.

To move the gear toward the right, back off the right hand adjusting nut one or two notches at a time and take up on the left hand nut the same number of notches, or, if the gear needs to go to the left, reverse the action. Take side play out of the bearings by these adjusting nuts. When the proper results have been obtained, tighten the bearing caps and see that the bearing adjusting nut locks are put in place.

Of course, it is impossible to make any adjustments of the transmission gears but if upon examination you find them in bad condition or if the gears are badly worn it will be necessary to replace both bearings and gears.

TWO CYLINDERS MISS

Q—A 1918 4-cylinder Studebaker runs fine when first starting, but after car has been run about five or six miles it begins to fire on only two cylinders, the No. 1 and No. 4. Then again this trouble may not be noticeable for a month or so when it appears again, making it necessary to let the engine stand still until it is perfectly cool. The points in the distributor are set correctly. The carbon has been removed and the carbureter, spark plugs and engine, as far as we know, are in good condition. The resistance wire gets very hot when car does not run properly or is this trouble caused by a bad battery? The battery is in a very poor condition. It runs the motor fine but we have to crank same.—Jos. Poettgen & Son, Garage, Freeburg, Mo.

If the engine runs correctly after it is allowed to stand and get cool it is certain that it must be overheating. With the battery in very poor condition it is very logical to assume that the ignition is very weak and probably late, as well. The fact that the resistance heats indicates that the current is not getting to the plugs, but is being absorbed by the resistance.

This resistance is placed in the circuit as a safety device and should the switch be left on, it will heat up, increasing the resistance so that very little current will pass, thus preventing a waste of current from the battery and damage to the ignition coil and timer contacts. We advise checking the wiring carefully and also testing the spark plug gap. The battery should either be charged or if it is in such poor condition that recharging will do no good, a new one will have to be installed. We are inclined to believe that the trouble is due entirely to the condition of the ignition system and we feel sure that the trouble will be remedied when ignition is in good shape. It might be advisable to check compression.

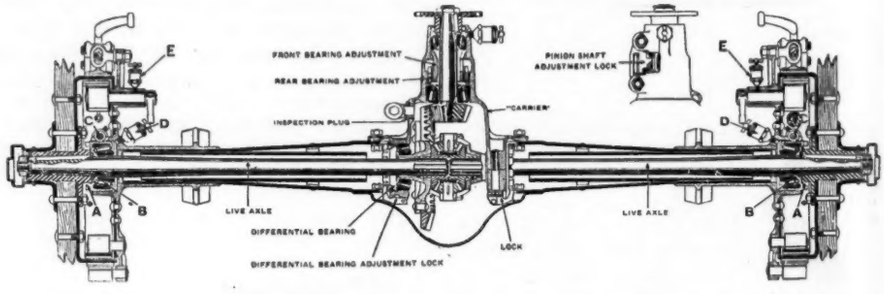


Fig. 3—Diagram of Hudson rear axle

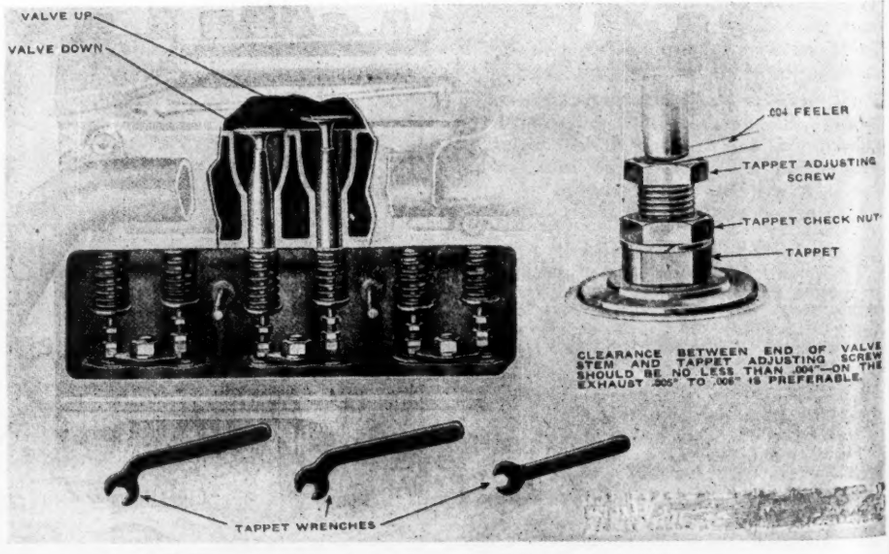

VALVE UP
VALVE DOWN
.004 FEELER
TAPPET ADJUSTING SCREW
TAPPET CHECK NUT
TAPPET
CLEARANCE BETWEEN END OF VALVE STEM AND TAPPET ADJUSTING SCREW SHOULD BE NO LESS THAN .004"—ON THE EXHAUST .005" TO .006" IS PREFERABLE.
TAPPET WRENCHES

Fig. 4—Valve adjustment of 1919 Hudson engine

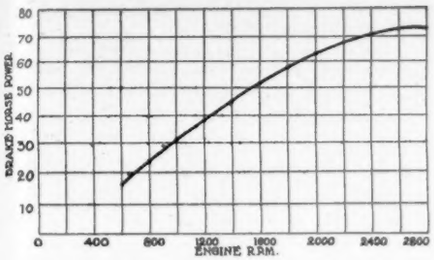


Fig. 5—Mercer 1919 power curve

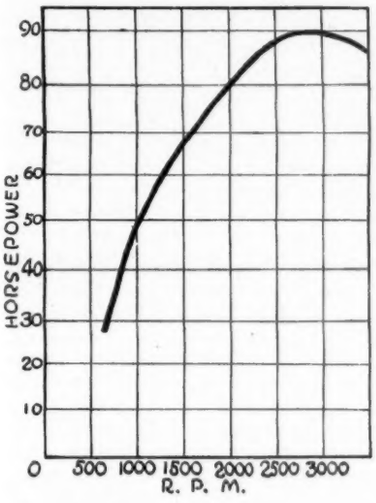


Fig. 6—Stutz 1919 power curve

POWER CURVES

Q—Publish power curve for the Series 4, Mercer, and 1919 Stutz.—L. B. Ockert, Roseville, Ill.

1—The power curves of these engines are shown in Figs. 5 and 6.

INTERCHANGING ENGINES

Q—Is the Olympian car still manufactured?

2—Could a Maxwell or Chevrolet engine be installed in an Olympian 1917 touring car and would those engines be of sufficient power to handle the Olympian?—F. O. Kennett, Albers, Ill.

1—The Olympian Motors Co. was purchased by the Friend Motors Co. at the beginning of the year. The Friend Motors Co. are to continue the manufacture of the Olympian car.

2—Since we have no detail drawings of these two engines nor a blueprint of the chassis layout it is impossible to say whether the engines are interchangeable or not. If it is possible to make the change there is no question but what the Maxwell engine has sufficient power to handle the car.

FUEL KNOCK

Q—A 1920 Dodge engine knocks when climbing hills, the sound being much like a carbon knock only not quite so sharp and occurring at lesser intervals when the engine is clean. Retarding the spark has little or no effect, but enriching the mixture by means of the dash control usually stops the sound even with a fairly full throttle. The present carbureter adjustment is correct for ordinary running. Is this what is known as a "fuel knock?" Has the exact nature of a "fuel knock" been determined? Would an additional cylinder head gasket be likely to effect a complete or partial remedy without material reduction in power?—Alexander Henderson, Chestnut Hill, Mass.

Due to the fact that enriching the mixture seems to lessen the violence of the knock indications are that the knock is a result of too weak a mixture. If the carbureter is set so lean that you get popping back in the carbureter when opening the throttle suddenly or, in other words, the setting is for maximum economy, it is very logical that a knock will be heard when the engine is put under a hard pull such as climbing a hill.

It is very difficult to tell whether it is a fuel knock or not but it is evident that the knock is of an individual character and is something that is not common to Dodge cars. We have heard of cases where using an additional cylinder head gasket has remedied trouble of this kind. This additional gasket will not produce enough difference in power to be noticeable.

ENGINE FOR BELT WORK

Q—How would you mount a Woods Mobilette cycle car for belt work using the clutch and transmission? It is still on its chassis, the differential being ground out and we would not care to go to the expense of fixing it up. The differential and gearset are in one unit. The transmission is to be used for starting loads.

2—What is the speed of the new Grant Six?—Bryan Redemus, Ashkum, Ill.

1—We believe that the best results can be obtained if you connect the pulley by means of a shaft and a couple of universal joints. Instead of using the transmission we advise using an idler. This will enable you to pick up the load, the system will be less complicated, and will be much easier to take care of.

2—Under average conditions the car ought to make in the neighborhood of 60 miles per hour.

FIGURING DISPLACEMENT

Q—Publish power curve of the Cunningham car, model V4.

2—Publish the formula for finding the piston displacement of engines.—E. Rosingana, McAlister, Okla.

1—See Fig. 8.

2—The displacement of an engine is the amount of gas that will be displaced by the pistons. The bore of the cylinder multiplied by 3.1416 will give the area which multifplied by the stroke will give the volume displaced by each piston. This, of course, multiplied by the number of cylinders will give the total displacement of the engine.

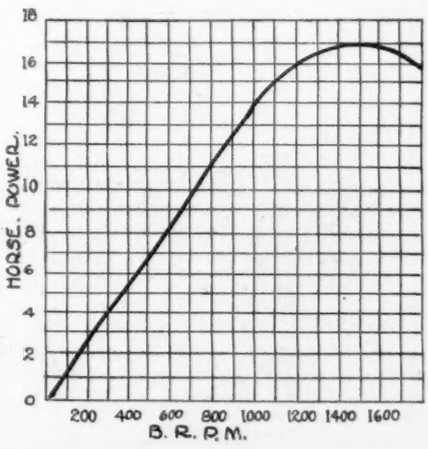


Fig. 7—Ford power curve

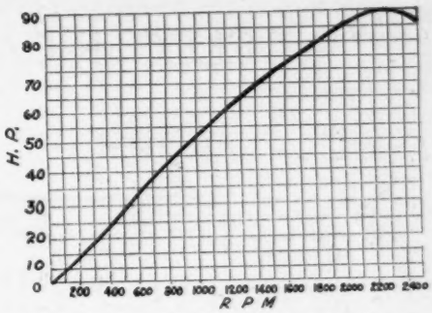


Fig. 8—Cunningham Model V 4 power curve

FORD POWER CURVE

Q—Publish power curve of the Ford engine.

2—Do you think it advisable to install counterbalances on the crankshaft of a Ford engine to eliminate vibration?—Holger Grundfor, Pocatello, Ida.

1—See Fig. 7.

2—The installation of counterbalances will reduce vibration considerably and we advise putting them on providing you wish to make the investment.

COMPRESSION LEAKS

Q—A 1914 Speedwell car model "G" weighs 4600 lbs. It is equipped with a Continental engine, Brown-Lipe clutch and transmission, Timken rear axle and has 37 by 5 tires. The car doesn't make much speed and is slow in climbing hills. Would you advise cutting the wheels down to 35 by 5 to increase the speed?

2—Two cylinders are "leaking by" on the engine. Would you advise reboring the six cylinders or putting in a new piston ring?—B. F. Schofield, Providence, R. I.

1—Cutting the wheels down to 35 in. in diameter will not increase the speed of the car but will have the opposite effect. The reason is as follows: Smaller tires naturally have a smaller circumference. From this it follows that a smaller wheel will make more revolutions per mile of travel than a larger wheel. Now if the wheels are reduced in size, the engine will have to turn up correspondingly faster to compensate for the decrease in wheel size.

2—If the two cylinders that are leaking, are on the same stroke of the crank, that is, if the two pistons come up at the same time as number one and number six do, then it will be better to regrind or rebore the whole engine. But if for instance cylinders number one and three leak, then a careful regrinding of these two will do until the whole engine needs a general overhauling. The pistons for these two cylinders, it should be remembered, must weigh very close to the weight of the other pistons, within one ounce at least.

We think you will find that if the valves are ground, the pistons fitted with good tight rings of some patented type, the bearings rescraped, and many other things gone over, which are too numerous to mention, you will find that the speed of the car will increase. It is not a question of power for your car has plenty of that. With the overhauling of all the little things you will find your troubles vanish.

ELECTRICAL SYSTEMS

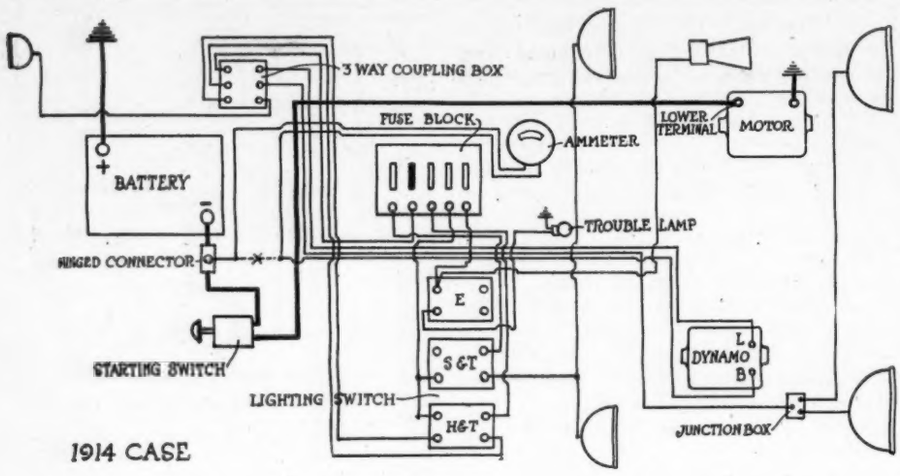


Fig. 9

CASE WIRING

Q—Publish wiring diagram of a 1914 model 35 Case car.—Albert L. Reda, Chicago, Ill.

2—See Fig. 9 for wiring diagram of 1914 Case car.

BOSCH MAGNETO OPERATION

Q—Publish illustration and explain the principle and operation of a Bosch magneto used on a 4 cylinder engine.

2—Explain how the Ford vibrator coils operate. The magneto on a Ford motor generates alternating current and the vibrators will also work when connected with dry cells which furnish direct current. It is my understanding that you cannot induce current into the ignition circuit with alternating current. Are there primary and secondary circuits in these coils?

3—What is the range in voltage of a Ford magneto?—Holger Grundfor, Pocatello, Ida.

1—The Bosch high tension magneto generates its own high tension current directly in the magneto armature without the aid of a step up coil, and has its timer and distributor integral. The armature winding is composed of two sizes of wire, one size comparatively heavy and the other very fine. The heavy wire is the primary or low tension circuit and the very fine wire is the secondary or high tension circuit. The rotation of the armature between the poles of strong permanent magnets creates or induces a current in the armature primary circuit, and this is further augmented at every 180 deg. revolution of the armature shaft by the abrupt interruption of the primary circuit by means of the magneto interrupter. At the opening of the primary circuit, the resulting discharge of the current from that circuit induces a current of high voltage in the armature secondary circuit. The high tension current thus created is collected by the collector rings on the armature and passed to the collector brush, then to the various magneo distributer terminals each of which is connected by cable to the spark plug in its respective cylinder.

The operation of the instrument will be more clearly understood from a study of the complete circuits, primary and secondary which follow. Refer to Fig. 10. The beginning of the armature primary circuit is in metallic contact with the armature core, and the end of the armature primary circuit is connected, by means of the interrupter fastening screw, to the insulated contact block supporting the long platinum contact screw on the interrupter.

The interrupter lever, carrying a short platinum contact screw, is mounted on the interrupter disc which, in turn is electrically connected to the armature core. The primary circuit is completed whenever the two platinum interrupter contact points are brought together, and interrupted whenever these contact points are separated. The high tension current is generated in the secondary circuit only when there is an interruption of the primary circuit, the spark being produced in the instant that platinum points separate.

In order to protect the armature and other current carrying parts, a safety spark gap is provided. Under ordinary conditions, the current will follow its normal path to the spark plug, but if for any reason the electrical resistance in the secondary circuit is increased to a high point, as when the cable becomes disconnected or a spark plug gap is too wide, the high tension current will discharge across the safety gap.

2—The Ford ignition coils are of the multiple unit vibrating type. There is one complete induction coil unit for each of the cylinders and a magnetically operated breaker of the vibrating type on each coil. Fig. 11 shows the coil and its circuits. In order to understand the action of the unit and the vibrator it will be necessary to follow the primary and secondary circuits.

When the switch is closed as indicated by the dotted lines, primary current will flow from the magneto terminal on top of the flywheel case through the wire 1 to the switch and wire 2 to one terminal of the primary winding. The current then flows around the primary winding and strongly magnetizes the core of the coil. The current upon leaving the coil flows through wire 3 to a spring blade B which is carried with one of its ends above, but not touching, the core of the coil.

A stationary brass bar is placed just above the spring blade and the contact points C are carried by these parts one contact by the spring blade and the other by the stationary bridge. The primary current flowing through the blade passes across the contacts, which are normally closed, and enters the bridge. The current then flows through wire 4 to the commutator. As you will note, wire 4 is connected with a segment. The roller of the commutator is grounded being one of the metal parts of the engine, and the current, therefore, flows through the segment and roller to ground.

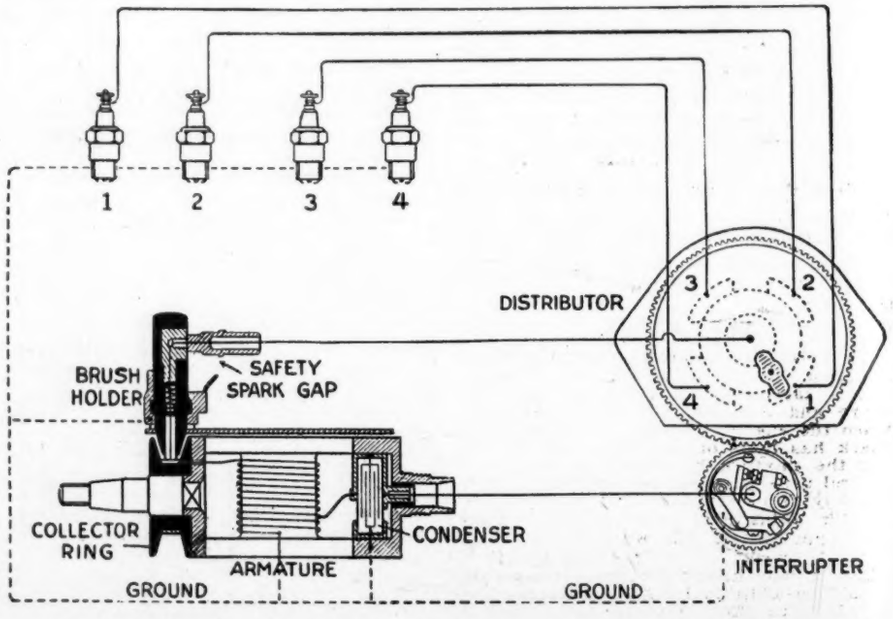


Fig. 10—Showing the principle of Bosch magneto on a 4-cylinder engine

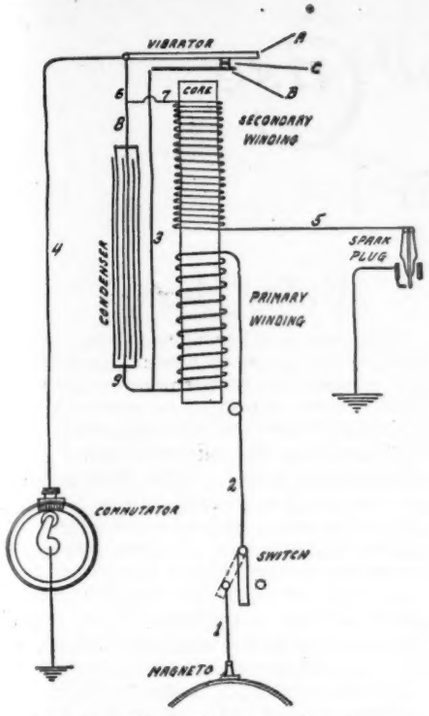


Fig. 11. Ford vibrator coil and complete circuits

As explained, one end of the coil winding of the magneto is grounded and the primary current returns through the ground to the magneto coils thereby completing the ignition circuit starting with the magneto and returning to it. When the commutator allows current to flow through the coil and around the primary winding, the core of the coil becomes magnetized and attracts the spring blade B. The end of the blade that carries the contact point is pulled down toward the upper end of the core and the contacts separate because bridge A is stationary.

The primary circuit is opened when the contact points separate. Of course, when the current stops flowing the coil is no longer magnetic and the blade B will be released. This rapid action of magnetizing and demagnetizing causes the vibration of the blade. The change of magentic strength of the core induces the current of high voltage in the secondary winding which is also wound around the iron center and the current then flows to the spark plug.

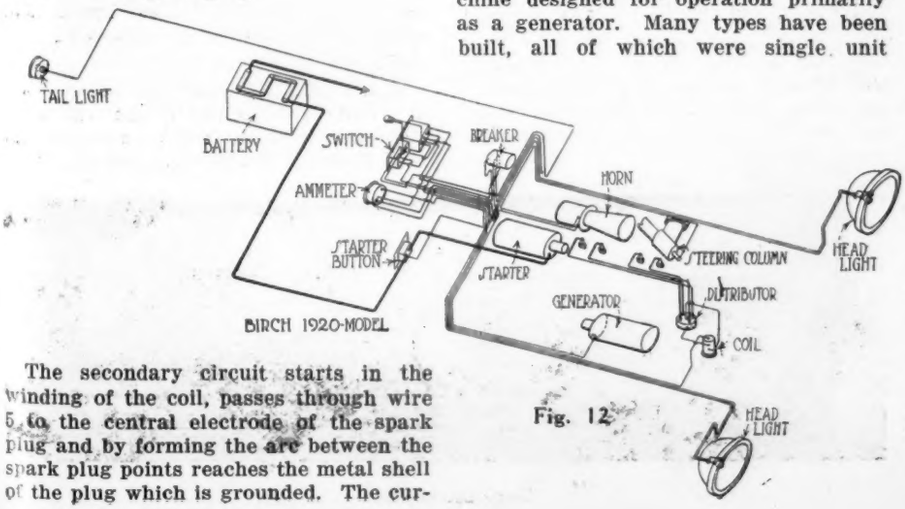


Fig. 12

The secondary circuit starts in the winding of the coil, passes through wire 5 to the central electrode of the spark plug and by forming the arc between the spark plug points reaches the metal shell of the plug which is grounded. The current passes through the ground to the roller of the commutator, thence to the segment and by way of wire 4 back to the coil box. To complete the circuit it flows through wires 6 and 7 back to the other end of the secondary winding from which it originally issued to the spark plug wire.

Thus you can see that the high tension current follows the same path as the low tension between the commutator and the coil. A condensor is provided which is connected between the two contact points of the vibrator so that the induced current of the primary will be absorbed on the break of the contacts and given back to the primary winding of the coil. The construction of one form of vibrator coil is shown in Fig. 13.

The parts are shown in their relative positions. The terminals marked 2, 4 and 5 are flat brass disks on the surface of the box which bear against three spring contacts. The only adjustment of the vibrator is the controlling gap between the contact points when they are opened. This adjustment is made by turning the knurled knob D up or down on the screw G.

•3—The Ford magneto generates about 18 volts at 1400 r.p.m.

ARMATURE BURNS OUT

Q—An Allis-Chalmers generator on a Fiat car has given quite a little trouble and we have been unable to locate the cause. When we received the generator, the armature was burnt up. We then sent the armature to a reliable firm for rewinding. When it came back it was put in the generator and ran about one-half hour when it burnt up again. The armature got hot when run at a very slow speed, so it was again rewound and tried out the second time with practically the same results.

At a speed of fifteen m.p.h. the generator charged thirty amperes and there was no adjustment for cutting this high rate of charge down. A relay on the outside of the generator would cut down the amount of charge going to the battery but would not cut down the rate of charge in the generator itself. We have tried cutting out field coils and numerous other things, but it has made little difference. Could you suggest how to remedy the trouble?—J. A. Schramm, Portsmouth, Ohio.

In the first place the Allis Chalmers Mfg. Co. has never furnished any equipment designed for installation on the Fiat car and has never built any machine designed for operation primarily as a generator. Many types have been built, all of which were single unit

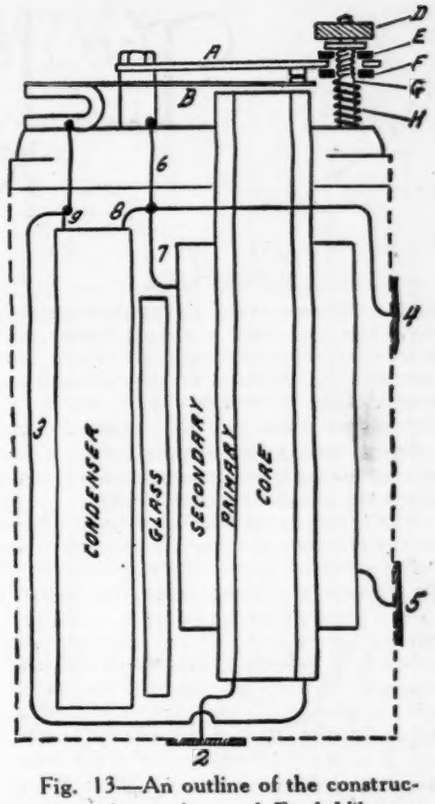


Fig. 13—An outline of the construction of one form of Ford Vibrator coil

motor generators to operate both as motors and generators. Any of the types can be used as generators if they are properly connected and installed to run at the correct speed.

Your description seems to indicate that the generator is being run without a regulator, in which case the current generated will increase very rapidly with an increase in speed and would burn out completely at comparatively low speed. The regulators and cutouts with which all of the installations were equipped, held the charging current at about 15 amperes at all speeds, until the speed dropped below that necessary to maintain the generator voltage higher than the battery voltage, at which time the cutout would operate to disconnect the generator from the battery. When used as a motor generator the series fields were connected to boost the shunt fields, but when used as a generator only, the series should be connected to buck the shunt field.

Nothing can be accomplished by cutting out any of the field coils or making other changes on the machine. The essential thing is to have the machine properly installed so as to operate at the correct speed and with the regulator properly adjusted. Lack of details in this case makes it impossible to give any recommendations, but we are sure that the Allis Chalmers Mfg. Co. can give recommendations.

BIRCH WIRING

Q—Publish wiring diagram of the Birch car equipped with the 6-volt Dyneto starting and generating system.—Maurice P. Bonvallet, Wichert, Ill.

1—See Fig. 12 for wiring diagram.

The Accessory Show Case

New Fitments for the Car

Temptrol

The Johnson Co., Detroit, manufactures the Temptrol, a simple device for regulating temperature and which is operated by hand from the instrument board. It is claimed to quickly warm up the motor after starting, maintain an efficient operating temperature regardless of weather conditions, and to conserve the heat in the waterjacket.

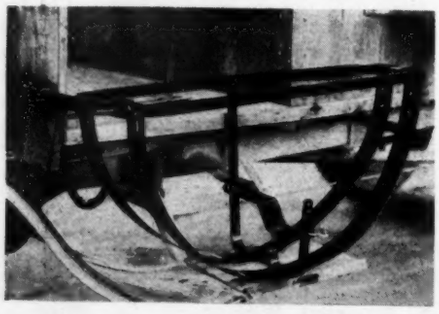
The device consists of a butterfly valve in the circulation pipe and an operating valve running to the instrument board. To operate Temptrol, press the control on the dash which temporarily holds the circulating water in the waterjacket where it is quickly heated to an efficient temperature. Slowly opening the valve will gradually bring the circulating water to the proper temperature and hold it at a good temperature while running. The price of this device is $7.50.

Opco Clearshield

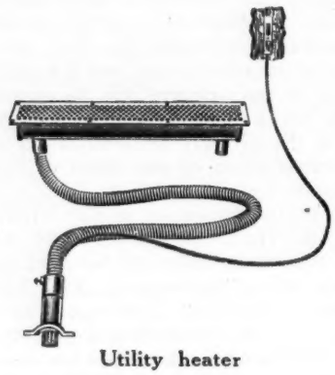
This is a cleaner or paste for windshields which is claimed to shed water and does not interfere with the driver's vision. It is made up in highly concentrated form, is said not to dry or shrivel up, and keeps under all conditions. The collection of moisture on the glass is said to be prevented by the application of Opco. It is made by the World Oil Products Co., Inc., New York City.

Ford Truck Tire Carrier

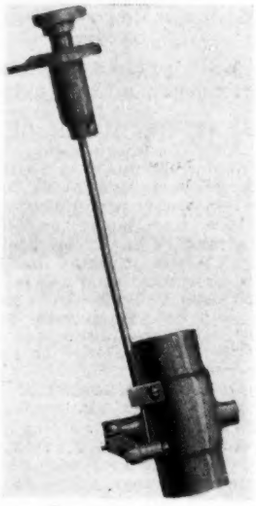
This carrier is made especially for Ford trucks by the Hastings Mfg. Co., Hastings, Mich. It is made to fit close to the body of the truck and is designed to carry one 32 by 3½ and one 30 by 3½ tire or demountable rim. It is said to be absolutely rigid, the bottom of the carrier being bolted to the running board, one end fastening to the front of dash, the other end to the body sill. A thief-proof self-adjusting locking device is claimed to lock it securely and prevents bouncing and chafing of the tires. The price of the carrier is $7.



Ford truck tire carrier



Utility heater



Temptrol temperature control

Service Unit

In the year-round touring sections, the dealer will be particularly interested in the service unit which the Boyce Mfg. Co., Los Angeles, has placed on the market. It is a container of varying capacities for emergency gasoline, oil and water, and can be clamped securely and snugly to the running board. Filling caps and handles are in the top and a steel channel bar fits over them, preventing rattles, serving as a protection to the cap and eliminating all possible loss while traveling.

Utility Heater

With cold weather approaching, attention will be given to winter accessories, and one of the first announcements of these winter comforts is made by the Hill Pump Valve Co., Chicago, which has just placed on the market a new Utility register-type heater. It is designed for cars too small to use the Utility foot-rail type, or for those who wish a heater sunk beneath the level of the floor yet combining all the qualities of the other type.

All that shows is the register, nickel plated, similar to registers in the home. The heater is easily controlled with one finger from the driver's seat. The 27 in. length, nickel finish, sells for $30; the Utility Jr., 17 in. long for coupes, Fords, tonneaus or other small cars and front seats of large cars, $22.50; and the Utility Jr., for Buicks, $25.

The company also has put on the market an improved design of the old model Utility foot-rail heater. This in the 27 in. length sells for $20; the 17 in. for front seats, coupes and small cars, $12.50; the Utility for Fords, $9, and the Utility DeLuxe for eight-cylinder cars, $25.

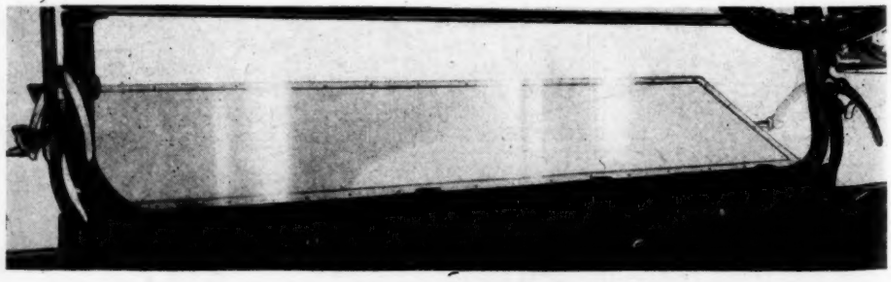
Doty Shield Visor

This is an adjustable shade for the windshield and is made in sizes to fit any open and some closed cars.

It is claimed to completely shut out the lights of other cars; in daytime driving will eliminate the glare of the sun; and in rainy weather protects the windshield so that the driver can see the road ahead.

It is built over a strong rigid frame which conforms to the shape of the top. The frame is covered with black top material, while the under side covering has a green Spanish leather finish. The metal parts are black enameled and nickel plated.

This visor, it is said, can be attached in 5 min., will not rattle, and will withstand the strongest wind. Made by the Auto Radiator Shutter Co., Dayton, O.



Doty shield visor

Service Equipment

Time Savers for the Shop

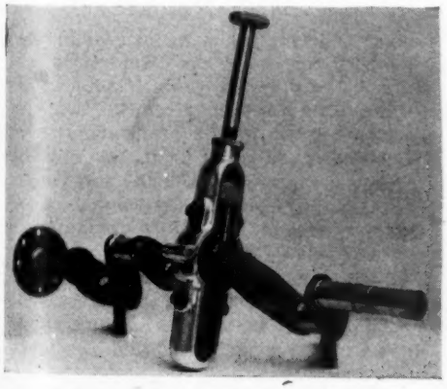
Shaftru Milling Tool

This is a small light tool, simple in construction, and designed to true crankshaft bearings. It is said to do the work accurately, quickly, cheaply, is compactly built and of a convenient size, its overall length being 16½ in.

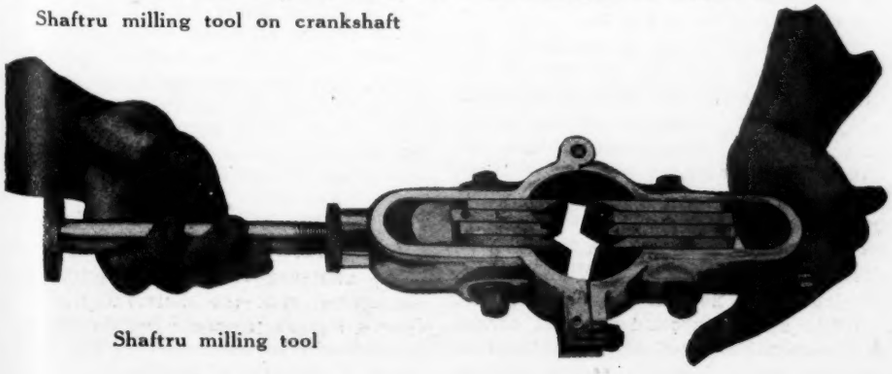
It is adjustable to any size bearing from 1 in. to 2¾ in. in diameter and any length from 1½ in. up. There is only one cutting blade and this is made of specially tempered steel. It is said to grind about twenty-five ordinary bearings before re-sharpening is necessary. It then may be removed from the tool and sharpened in the ordinary manner. All parts are standardized and may be quickly replaced. The Atherton-Salter Mfg. Co., St. Louis, Mo., is the manufacturer.

Apco Transmission Tool

A handy tool for the repair man is the Apco transmission tool designed to eliminate some of the difficulties experienced in holding transmission bands together while assembling. The clamp holds the bands in perfect alignment and is instantly applied. The wrench is drop forged, milled to the exact size of the adjustment nuts and the chain eliminates the possibility of losing the wrench in the transmission case. The Apco Mfg. Co., Providence, R. I., sells this tool for $1.

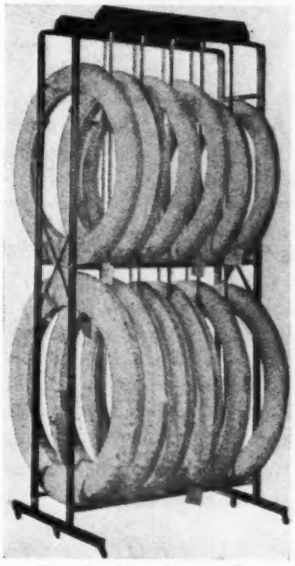


Shaftru milling tool on crankshaft



Shaftru milling tool

Apco transmission tool



Crackerjac tire rack

Valve Grinding Compound

Clover Valve Grinding Compound manufactured by the Clover Mfg. Co., Norwalk, Conn., is an abrasive and is quick cutting, producing a polished surface with a small amount of effort. This compound is prepared in neat containers which are very handy for the service man to keep in his repair kit.

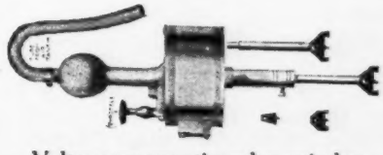
Crackerjac Tire Rack

The tire rack, shown in the illustration, is a portable rack which takes up very little space and will accommodate twelve of the larger size tires or more of the smaller tires. The height of the rack is 80½ in., the width 40 in., depth between uprights 14 in. and the space between sections 6½ in. A rack of this kind will enable a service station to keep the tires in good condition where they can be seen and where they can be taken out of stock immediately. The rack is listed at $18 by the Even L. Reed Mfg. Co., Sterling, Ill.

Veltum Pneumatic Valve Grinder

The Veltum pneumatic valve grinder, shown below, operates at any speed from 50 to 1000 strokes per minute, which will permit preliminary at low speed, intermediate grinding at high speed and finishing at low speed. It operates on 15 to 500 lb. of air and provides ample power to grind any size valve. Valve cages can be ground as well as the valve. Very delicate work such as grinding carbureter valve stem and fuel system valves can also be accomplished with this machine. Aluminum castings throughout give the grinder extreme lightness, the entire machine weighing only four pounds. The dealers' price listed by Warnock-Wirth Co., located at 624 S. Michigan Ave., Chicago. Ill., is $22.50.

Offset socket wrench



Veltum pneumatic valve grinder

Offset Socket Wrench

This wrench claims to be especially useful for work on a Ford car. The handle of steel is knurled to give a good grip, and its overall length is 10½ in. The socket is broached to exact ⅝ in., hexagon size and is said to be very strong. The Goodell-Pratt Mfg. Co., Greenfield, Mass., sell the wrench for 90 cents.

Law in Your Business

By Wellington Gustin

Employee Recovers Compensation for Injuries by Own Car

Rule Is Whether Hazards of Employment Caused the Damage

THE Workmen Compensation Acts of the various states are being construed by the courts very liberally and favorably to the employee. This is a policy adopted by the courts in order to carry out the purposes of these acts because they avoid and abrogate universal common law principles of negligence and excessive damages recoverable by an injured workman.

The extent to which the law is carried on the one hand and the fight often waged on its application, is shown in the decision of the New York Supreme Court, Appellate Division, just rendered. The accident is an all too common one. It appears that the employee was required to go to the factory on Sundays to see that certain things were in shape for work Monday morning.

USES OWN CAR TO EXPEDIATE WORK

He drove his employer's truck on week days, and on the Sunday of the accident he had to get spark plugs for the truck before it could be used Monday morning. He had a Ford car of his own and it was there at the factory. Intending to go to some garage to locate the proper spark plugs, he desired for the truck, the employee started to crank up his Ford car. It backfired, kicked, and broke both bones of his right wrist. The State Commission awarded compensation to the employee.

The employer appealed the case contending that the accident did not arise out of and was not incident to, the business he was employed to help carry on; in other words as the court explains, the employer contends that the employee ought to have walked around from garage to garage, looking for spark plugs for them, instead of riding in his car while so doing.

The court said the New York rule in such cases was that, to permit of recovery, the court must be able to see that the hazards which accompanied the duties of the employee have turned against him, to his loss and damage. In this case, while the use of the car would find the plugs in a shorter time than if he had walked, the court said there was the additional fact that the job he started to do had to be done for the employer to the employer's advantage, and with no pecuniary advantage to himself.

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty problems as may be submitted to him.

LIABILITY OF OWNER OF TRUCK LOANED FOR JOY RIDING—BORROWER NEED ONLY TO BE WARNED OF KNOWN DEFECTS

HOW far the owner of a truck or automobile must be on his guard to prevent suits for damages against himself in the operation or loan of such truck or car is shown in a recent case decided by the Supreme Court of Connecticut. Johnson vs. Bullard Co. 111 A. 70.

The facts were that on Armistice Day the driver of a truck for the H. M. Bullard Co. after the day's celebration, telephoned the manager of the truck department for permission to take the truck for the evening in order that he might take some friends out to ride. The permission was given and the driver picked up some fifteen young men as he drove through the town. The body of the truck was not fitted for passengers.

While driving around a street corner at a reasonable speed and with due care the body broke from the chassis, slid off and overturned causing the death of one of the men riding on the truck.

An action was brought against the truck owner to recover damages for negligence in causing the death. The only negligence charged was that the body of the truck was defective and unfit for use.

The truck chassis, consisting of a motor, cab, frame, and wheels was new, but the body was an old one, having been loaned by the sales agency until a new body was completed. The old body had been attached to the new truck by the agency before delivery to the Bullard company. Certain defects due to wear and exposure were found in the stringers of the old body, but these were not noticeable by observation before the accident. Other defects found appear not to have been known or brought to the attention of the truck owner or its servants.

OWNER NOT LIABLE FOR DEFECTS NOT KNOWN

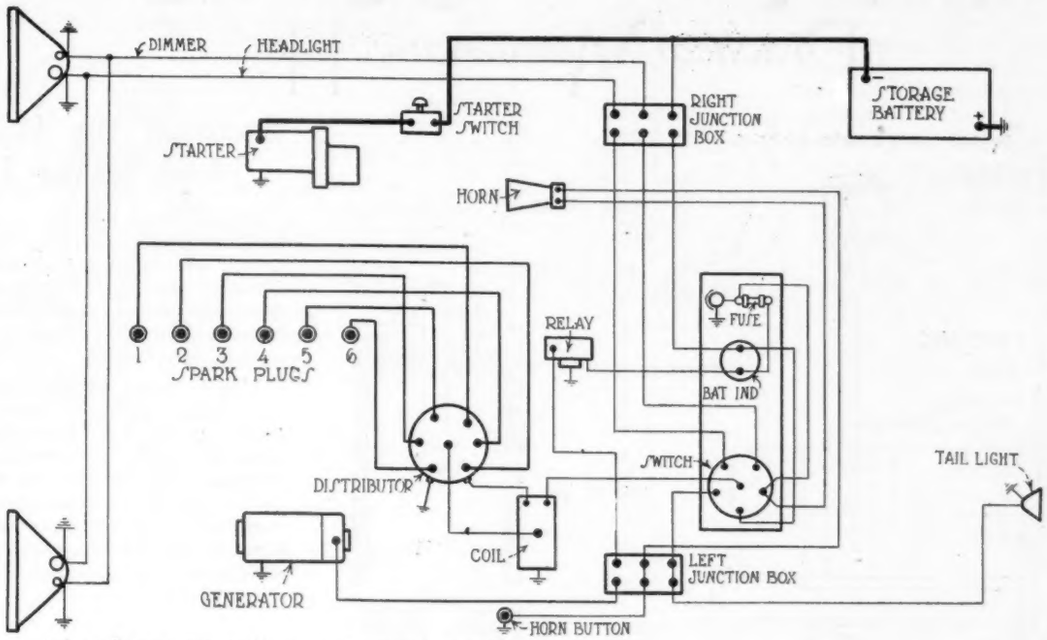
The Supreme Court in its opinion says that with respect to the discharge of any duty to the driver and his friends by the owner this knowledge as to the dangerous defects in the truck must have been known on or prior to the time the truck was loaned. From the facts given there was no proof of actual notice of any defect rendering the truck dangerous to operate in carrying persons.

Since the truck was loaned gratuitously the owner is only bound to warn the borrower of defects of which he knew, and need not even warn of defects open and patent to the borrower; neither is the lender liable for failure to warn as to defects of which he did not know, though he might well have known of same, the law merely forbidding one person to lay a trap for another. One riding in the truck upon invitation of the borrower has no greater rights against the owner than the borrower.

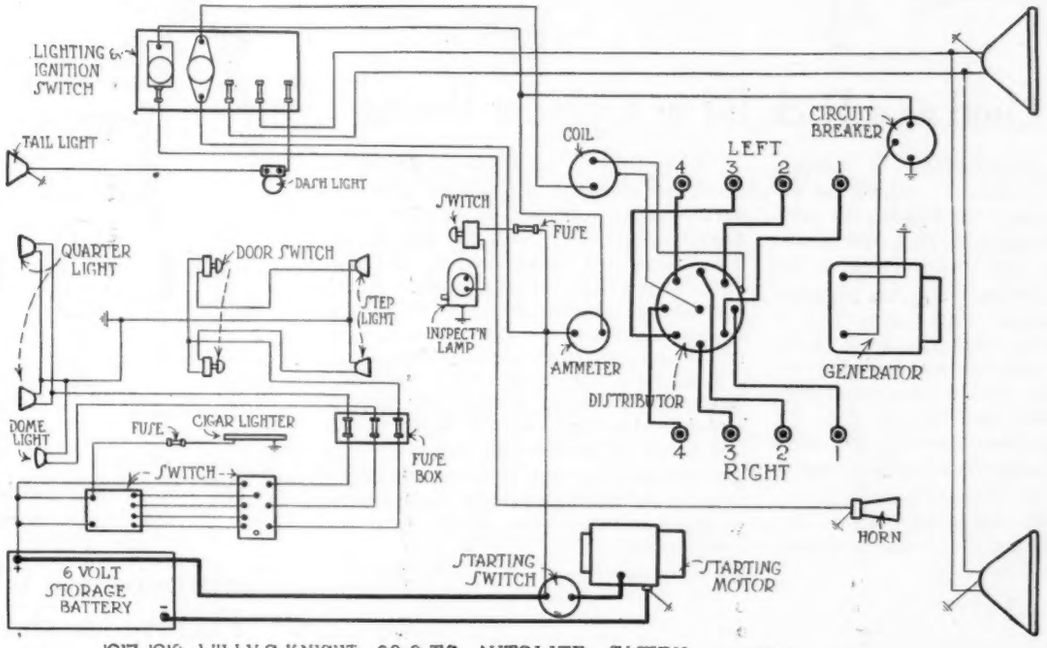
HARE'S MOTORS IN OREGON

New York, Oct. 8—C. R. Norton, Pacific coast manager for Hare's Motors has announced that the distribution of all Hare's Motors products for the state of Oregon will be controlled by the Willamette Motors Co. of Portland.

Motor Age Weekly Wiring Chart No. 99



1919 1920 ELGIN- WAGNER SYSTEM



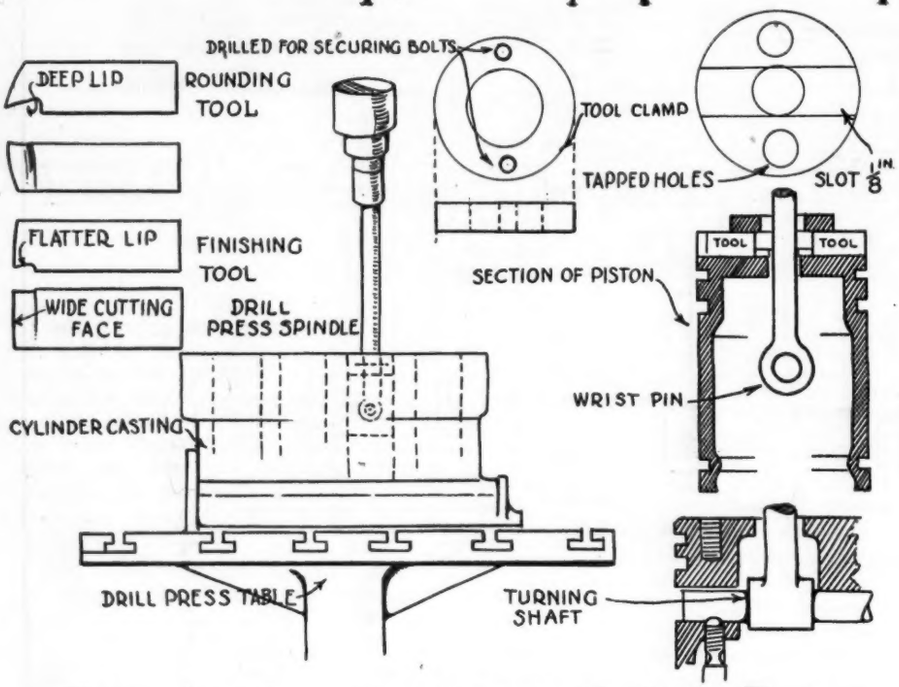
1917-1918 WILLYS-KNIGHT 88-8-TC AUTOLITE SYSTEM

Name of car and date on which wiring diagrams have appeared in previous issues

Allen—June 17, '20
Sept. 30, '20
Apperson—Aug. 5, '20
Auburn—Sept. 9, '20
Briscoe—May 6, '20
Buick—July 15, '20
Case—Aug. 5, '20
Oct. 7, '20
Chalmers—June 17, '20
Chandler—May 20, '20
Cole—June 10, '20
Crow-Elkhart—July 29, '20
Davis—Aug. 12, '20
Sept. 2, '20
Dort—Aug. 12, '20
Dodge—Sept. 23, '20
Elcar—May 6, '20
Franklin—June 3, '20
General Battery Charging—Sept. 15, '19
General Magneto Diagram—June 15, '19
Grant—Aug. 12, '20
Harroun—July 15, '20
Haynes—June 24, '20
Internal Connections—July 10-17-24, '19
Jeffery—May 13, '20
Jordan—June 10, '20
July 22, '20
King—May 20, '20
Kissel—May 27, '20
Aug. 19, '20
Lexington—July 29, '20
Locomobile—June 3, '20
Moline-Knight—May 20, '20
July 22, '20
Moon—July 29, '20
Aug. 19, '20
Sept. 2, '20
Oldsmobile—Sept. 16, '20
Packard—Oct. 7, '20
Peerless—May 13, '20
Pierce-Arrow—July 15, '20
Reo—July 22, '20
Roamer—Aug. 5, '20
Sept. 30, '20
Saxon—Sept. 9, '20
Scripps-Booth—Aug. 26, '20
Stephens—Sept. 16, '20
Studebaker—July 1, '20
Stutz—July 8, '20
Special Systems for Fords—May 15-22, '19

The Automotive Repair Shop

Practical Maintenance Hints

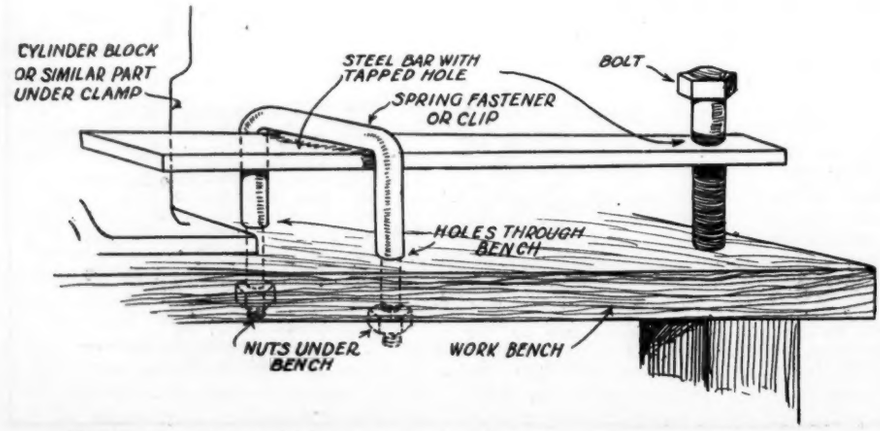


Piston Used as a Pack Bit in Cylinder Boring

The main consideration in boring scored or worn cylinder blocks is in holding the cutting tool steadily to prevent wabble, thereby having the blade held in contact with the surface to be cut without chattering. For this purpose in machine shop work on boring jobs a wooden pack bit is used, the wood being an inexpensive substitute for a steel or cast iron guide. When reboring, new pistons are used and one of the old pistons can be given over to the construction of a boring tool without added expense.

The boring can be readily done in the drill press entailing the least blocking, as the casting is squarely seated on the table and clamped. Alignment under the drill spindle need not be exacting, as a flexible connection with the boring tool will allow for looseness in the drill spindle and lack of alignment. Modify the piston for the insertion of cutting tools as shown in the sketch and arrange the turning shaft as is also shown.

Take two cuts, a roughing cut and a finishing cut, using a tool with less lip and a wider face for the finishing cut. Use heavy oil on the tool, especially during the finishing cut to make the improvised pack bit run true and central in the cylinder and the cutter, machine the surface smooth.

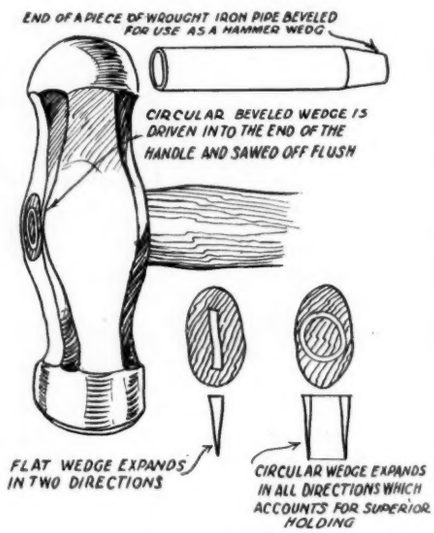


Clamp devised to hold heavy parts firmly to bench when working on them

Securing the Hammer Head to the Handle

An effective method of securing the head of a hammer to the handle is as is shown in the sketch. This consists of grinding the end of a piece of wrought iron pipe to a beveled edge and driving it into the end of the handle after removing the iron wedge.

This is sawed off flush with the handle after being driven in solidly. The iron wedge persists in loosening and dropping out, while the circular pipe wedge obtains a better grip in the wood, and due to its shape expands the wood surrounding it in all directions. This expanding of the wood in the circle accounts for the superior holding of the round wedge.

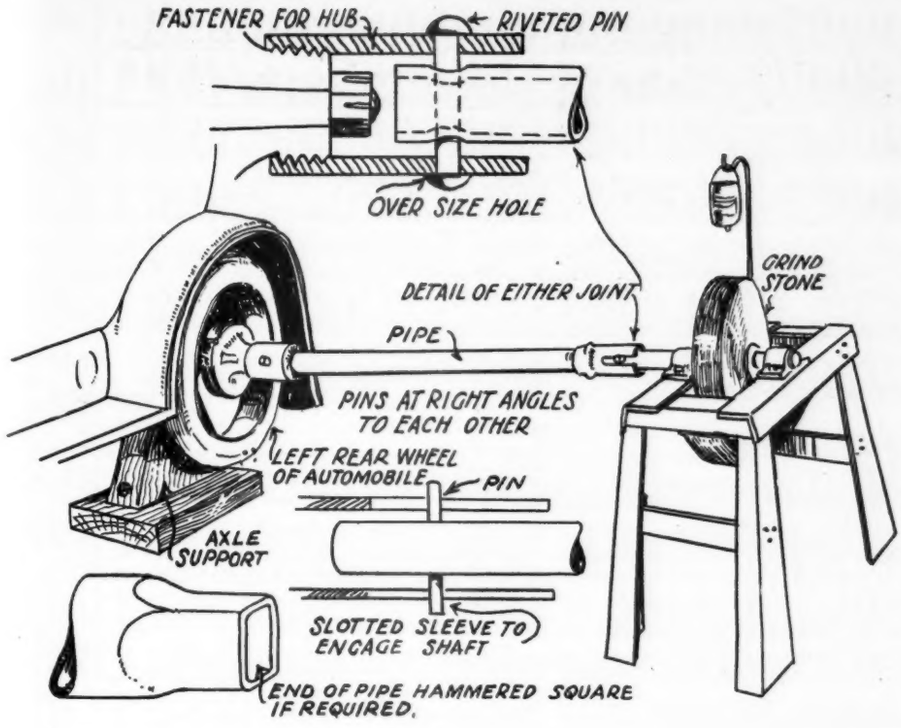

END OF A PIECE OF WROUGHT IRON PIPE BEVELED FOR USE AS A HAMMER WEDG
CIRCULAR BEVELED WEDGE IS DRIVEN INTO THE END OF THE HANDLE AND SAWED OFF FLUSH
FLAT WEDGE EXPANDS IN TWO DIRECTIONS
CIRCULAR WEDGE EXPANDS IN ALL DIRECTIONS WHICH ACCOUNTS FOR SUPERIOR HOLDING

Accidents in the shop may be avoided by the simple device above

Improvising a Clamping Fixture for the Bench

In the absence of a vise or in the instance where a large casting of cylinder block, transmission or axle housing is to be held securely while being repaired, a fixture as shown in the sketch can be improvised from most any available material.

The one shown is simply a bolt inserted in a threaded hole through a steel bar. A spring securing clip is bolted to the top of the work bench with nuts on the under side. Clamps of this type are adjustable to almost any size or shape part and the bolt is tightened to hold the part securely. This clamp is handy for holding small parts for drilling and reaming.

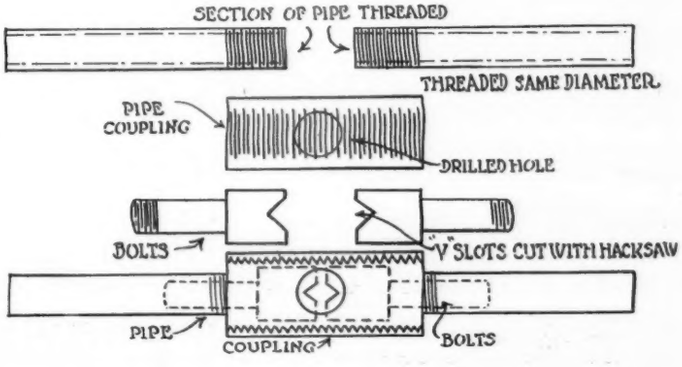


Linking the Grindstone to the Car's Wheel Hub

In the repair shop or for farm or home purposes an attachment as is shown in the below sketch expedites the work and lightens the efforts incident to grinding. Similarly this flexible shaft may be used to drive most any machinery for a short period of time or periodical use. The attachment consists of one long section of light pipe and two short sections pivotally arranged with two riveted pins.

The end of one pipe is provided with a thread corresponding to the thread of the wheel hub. The opposite end is squared out or slotted as is desired to engage the shaft of the grindstone or other machine.

This drive is fitted to the left rear wheel hub which provides against the shaft unscrewing. Lifting the wheel off the ground is obvious to do the driving. The change speed mechanism of the car provides variable speeds as desired.



Tap or Reamer Wrench Made of Pipe

A serviceable tap and reamer wrench that is simple in construction is shown in the sketch.

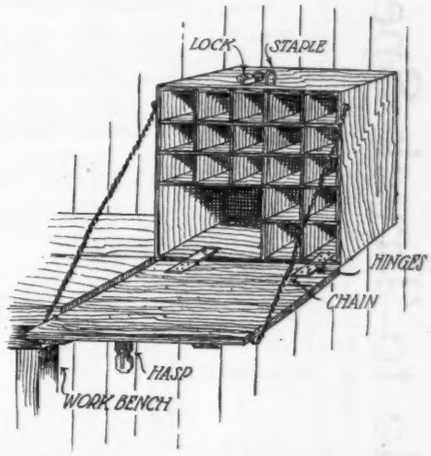
The material used in this wrench is, two sections of pipe, two bolts, and a pipe coupling. The heads of the bolts are cut V shaped with the hacksaw. One end of each pipe is threaded to correspond to the thread in the pipe coupling. The pipe coupling is drilled at the center to admit the tap or reamer end.

The parts are assembled as shown, and to use, the tool is inserted between the bolt heads and the pipe turned to clamp the tool. The size of the parts are of course varied to meet the requirements, the heavier the pipe used the sturdier the wrench.

Crate Converted Into Useful Garage Shelves

Crates used as containers for shipping bottled beverages make excellent tool racks when placed on the wall of the garage at the side of the work bench. The hinged lid is useful for closing the tool equipment up inside and locking to prevent the tools being disturbed if desired.

Two pieces of chain arranged to permit the lid to swing partly open provides a shelf that adds further to the usefulness of the tool case. If the compartments are not large enough to insert part of the equipment, several of the partitions can be removed and various sizes of spaces obtained.

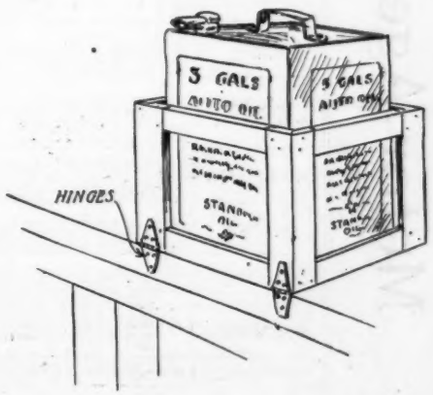


Bottled goods crate which can be used as a handy container for tools and parts

Oil Can Tipper

There are several patented five gallon oil tin tipping devices now being sold on the market, but the writer has used the scheme shown in the accompanying sketch, and considers it as handy and good as any device sold.

The crate is built to fit the standard 5-gallon oil tin and is hinged to the edge of the bench. When one desires to draw off oil into a small can it is an easy matter to tip the large can with one hand.



Crate hinged to edge of bench will facilitate tipping the heavy cans of oil

Motor Age Monthly Guide to Truck Specifications

These tables are revised and brought up to date monthly

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Name of Engine	No. Cyl. Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
A & B 3T	3	.....	48x3½d	48x3½d	Own	4-5.17x4½	Bosch	none	none	Scheb	none	Own	in-g	Own	Gem
A & B 5T	5	.....	48x3½d	48x5d	Own	4-5.17x4½	Bosch	none	none	Scheb	none	Own	in-g	Own	Gem
Acason R	1	$2,400	36x3½	36x5	Wauk.	4-3½x5½	Eise.	.....	Wauk.	Marvel	Fuller	Fuller	worm	Timkn.	Ross
Acason RB	1½	2,650	36x3½	36x6	Wauk.	4-3½x5½	Eise.	.....	Wauk.	Marvel	Fuller	Fuller	worm	Timkn.	Ross
Acason H	2½	3,850	36x4	36x8	Wauk.	4-4½x5½	Eise.	.....	Wauk.	Marvel	Detlaff	Cotta	worm	Timkn.	Ross
Acason L	3½	4,900	36x5	40x5d	Wauk.	4-4½x6½	Eisg.	.....	Wauk.	Marvel	Detlaff	Cotta	worm	Timkn.	Ross
Acason M	5	5,850	36x6	40x6d	Wauk.	4-5x6½	Eise.	.....	Wauk.	Marvel	Detlaff	Cotta	worm	Timkn.	Ross
Acason Tractor	6	.....	36x4	36x7	Wauk.	4-4½x5½	Eise.	.....	Wauk.	Scheb.	B &B.	Cotta	worm	Timkn.	Ross
Acason Tractor	10	.....	36x5	40x5d	Wauk.	4-4½x6½	Eise	.....	Wauk.	Scheb.	B &B.	Cotta	worm	Timkn.	Ross
Ace	1½	3,100	34x3½	34x5	Buda	4-4½x5½	A-K	West	Pierce	Scheb.	M.&E	Cotta	worm	Timkn.	Ross
Ace	2½	3,800	36x4	36x7	Buda	4-4½x5½	A-K	West.	Pierce	Scheb.	M.&E	Cotta	worm	Timkn.	Ross
Ace	3½	3,800	36x4	36x7	Buda	.....	A-K	West.	Pierce	Scheb.	M.&E.	Cotta	worm	Timkn.	Ross
Acme B	1	2,175	34x3½	34x5	Cont.	4-3½x5	Eise.	G&D	Duplx.	Ray.*	B.&B.	Cotta	worm	Timkn.	Ross
Acme F	1½	2,375	34x3½	34x5	Cont.	4-3½x5	Eise.	.....	Duplx.	Ray.*	B.&B.	Cotta	worm	Timkn.	Ross
Acme A	2	3,050	36x4	36x7	Cont.	4-4½x5½	Eise.	.....	Duplx.	Ray.*	B.&B.	Cotta	worm	Timkn.	Ross
Acme C	3½	4,050	36x5	40x5d	Cont.	4-4½x5½	Eise.	.....	Duplx.	Ray.*	B.&B.	Cotta	worm	Timkn.	Ross
Acme E	5	5,150	36x6	40x6d	Cont	4-4½x6	Eise.	.....	Cont.	Ray.*	B.&B.	Cotta	worm	Timkn.	Ross
Aetna	1½	2,775	36x3½	36x5	Wis.	4-3½x5	Bosch	.....	.....	Zenith	B.&B.	Cotta	worm	Shel.	Ross
Air.O.Flex C	1½	.....	36x3½	36x5	Buda	4-3½x5½	Wag.	.....	Pharo	Strom.	B.&B.	B.Lipe	in-g.	Russel	Ross
All-American	1	1,795	33x4*	32x4	H-S	4-3½x5	Simms	none	none	Strom.	Detlaff	Cotta	in-g.	Torbn.	Lavn.
All-American	1½	2,195	34x4	34x5	H-S	-3½x5	Simms	.....	.....	Strom.	Detlaff	Cotta	in-g.	Torbn.	Lavn.
All-American	2½	2,395	34x4	34x6	H-S	-3½x5	Simms	.....	.....	Strom.	Detlaff	Cotta	in-g.	Torbn.	Lavn.
All-Power C	3½	.....	36x6	36x10	Cont.	4-4½x5½	Eise.	West.	Mon.	Zenith	Detlaff	Cotta	worm	Timkn.	Ross
Apex C	1	1,745	33x4	32x3½	Bdua	4-3½x5½	A-L	A-L	none	Strom.	Fuller	Fuller	in g.	Torbn.	Lavn.
Apex D	1½	1,915	32x3½	32x4	Buda	4-3½x5½	A-L	A-L	none	Strom.	Fuller	Fuller	in g.	Torbn.	Lavn.
Apex E	2½	2,695	36x4	36x6	Buda	4-4½x5½	Eise.	Eise.	Duplx.	Strom.	Fuller	Fuller	in-g	Torbn	Lavn.
Armleder HW	2½	.....	36x4	36x4d	Cont.	4-4½x5½	Bosch	none	none	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Armleder KW	3½	.....	36x5	36x5d	Cont.	4-4½x5½	Bosch	none	none	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Atco IG.10	1	.....	34x4½	36x6	.....	4-3½x5½	.....	West.	.....	Strom.	Fuller	Fuller	in-g.	Torbn.	Ross
Atlas	1	1,765	32x4½	32x4½	Lyc.	4-3½x5	A-K	Bijur	none	Marvel	B.&B.	Own	worm	Own	C.A.S.
Atterbury 7CX	2½	3,375	36x4	36x4d	Cont.	4-4½x5½	Berl.	none	Mon.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Atterbury 7D	3½	4,175	36x5	40x5d	Cont.	4-4½x5½	Berl.	none	Mon.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Atterbury 8E	5	5,575	36x5	40x6d	Cont.	4-4½x6	Berl.	Delco	Cont.	Zenith*	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Autocar 21UF	2	2,300	34x4	34x5	Own	2-4½x4½	Bosch	none	none	Strom.	Own	Own	d-rd.	Own	Own
Autocar UG21	2	2,400	34x4	34x5	Own	2-4½x4½	Bosch	none	none	Strom.	Own	Own	d-rd.	Own	Own
Available H-1½	1½	2,750	35x5	38x7	Own	4-4x5½	Bosch	Opt.	Pierce	Strom.	Detlaff	Cotta	Worm	Wis.	Ross
Available H-2½	2½	3,475	38x7	42x9	Cont.	4-4½x5½	Bosch	Opt.	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timk.	Ross
Available H-3½	3½	4,475	36x5	40x5d	Cont.	4-4½x5½	Bosch	Opt.	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timk.	Ross
Available H-5	5	5,575	36x6	40x10	Cont.	4-4½x6	Bosch	Opt.	Cont.	Strom.	B-Lipe	B-Lipe	worm	Timk.	Ross
Available H-7	7	6,000	36x6	40x14	Wauk.	4-5x6½	Bosch	Opt.	Wauk.	Strom.	B-Lipe	B-Lipe	worm	Savage	Ross
Beck 1-ton	1	1,650	34x3	34x3	Cont.	4-3½x5	Bosch	.....	Pierce	Strom.	Fuller	.....	in-g.	Clark	Lavn.
Beck A	1½	1,850	34x3½	34x5	Cont.	4-3½x5	Bosch	.....	Pierce	Strom.	Fuller	.....	in-g.	Clark	Lavn.
Beck B	1½	2,050	34x3½	34x6	Cont.	4-3½x5	Bosch	.....	Pierce	Strom.	Fuller	.....	in-g.	Clark	Lavn.
	2														
Beck C	2	2,450	36x4	36x7	Cont.	4-4½x5½	Bosch	.....	Pierce	Strom.	Fuller	.....	in-g.	Clark	Lavn.
	2½														
Beck D	3	3,700	36x5	36x5d	Cont.	4-4½x5½	Bosch	.....	.....	.....	.....	.....	worm	Shel.	Lavn.
	3½														
Bell	1½	.....	32x3½	32x4	Buda	4-3½x5½	Eise.	.....	Duplx.	Strom.	B.&B.	.....	.....	Russel	.....
Bell O	2½	.....	34x4	34x6	Buda	4-4½x5½	Eise.	.....	Duplx.	Strom.	B.&B.	.....	in g.	Russel	Gem.
Belmont AA	½	1,150	31x4	31x4	.....	4-3½x5	Conn.	Dyn.	Pierce	Zenith	G-Lees	G-Lees	in-g.	Clark	Lavn.
Belmont BB	1½	1 950	34x4½	36x5	Cont.	4-3½x5½	Eise.	Dyn.	Pierce	Zenith	G-Lees	G-Lees	in g.	Clark	Lavn.
Bessemer G	1	1,600	34x3	34x4	Cont.	4-3½x5	Bosch	Opt.	none	Ray.	Fuller	Fuller	in g.	Torbn.	Ross
Bessemer H-2	1½	2,085	36x3½	36x5	Cont.	4-3½x5	Bosch	Opt.	Pierce	Ray.	B.&B.	.....	in g.	Torbn.	Ross
Bessemer J-2	2½	2,785	36x4	36x4d	Cont.	4-4½x5½	Bosch	Opt.	Pierce	Ray.	B.&B.	B-Lipe	in-g.	Torbn.	Ross
Bessemer K-2	4	4,285	36x4½	36x10	Cont.	4-4½x5½	Bosch	Opt.	Pierce	Ray.	B.&B.	B-Lipe	in g.	Torbn.	Ross
Bethlehem K	1	1,695	34x4½	35x5	Own	4-3½x5	Bosch	G&D	none	Zenith	B.&B.	Det.	in-g.	Stan.P	Ross
Bethlehem G	2	2,395	34x3½	34x6	Own	4-4x5½	Bosch	G&D	Pierce	Zenith	B.&B.	Det.	in g.	Russel	Lavn.
Bethlehem H	3	2,795	36x4	36x8	Own	4-4x5½	Bosch	G&D	Pierce	Zenith	B.&B.	Fuller	in-g.	Russel	Lavn.
Bethlehem J	4	3,995	36x5	36x5d	Own	4-4½x5½	Bosch	G&D	Pierce	Zenith	B.&B.	Fuller	in g.	Torbn.	Lavn.
Betz	2½	2,700	36x4	36x7	Buda	4-4½x5½	Bosch	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Bollstrom A	5	.....	36x6	36x6	Own	4-4½x5½	Bosch	none	.....	Strom.	.....	Own	in g.	Own	Gem
Brintor H	1	1,500	33x4½*	33x4½*	Wis.	4-3½x5	.....	.....	none	.....	.....	.....	worm	Shel.	Ross
Brinton F	2½	3,400	36x4	36x6	Cont.	4-4½x5½	Bosch	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Duplex Limited A	1½	2,775	35x5	38x7	Hink.	4-4x5½	West.	West.	.....	Strom.	Covert	Covert	worm	Shel.	Ross
Duplex E	3½	4,250	36x8	36x8	Buda	-4½x5½	Eise	Own	none	Strom.	B-Lipe	B-Lipe	in-g.	Own	Wohl.
Duty	2	1,490	34x3½	34x5	Gray	4-3½x5	Simms	.....	.....	Zenith	Covert	Covert	in-g.	Russel	Ditw.
Eagle	2	1,995	34x3½	34x6	Buda	4-3½x5½	Eise.	.....	.....	Zenith	Covert	Covert	worm	Russel	.....
Economy T-LHD	½	1,250	35x5	35x5	Own	4-3 ½x5½	A-L	A-L	none	none	Zenith	Warner	in-g	Torbn	Jacox
Elmira C	½	.....	29x3	28x3	Perk.	4-3½x4	A-K	Carl.	none	Holl.*	Own	Own	bevel	Own	Own
Ellsworth 25-A	1½	.....	30x3½	30x3½	Lyc.	4-3½x5	Conn.	.....	none	Car.	Lyc.	G-Lees	bevel	Wis.	Foster
Erie	1½	.....	34x3½	36x5	Buda	4-3½x5	Bosch	.....	Pierce	Strom.	.....	.....	worm	Tinkm.	.....
Erie	2	.....	34x3½	36x5	Buda	4-4½x5½	Bosch	.....	Pierce	Strom.	.....	.....	worm	Timkn.	.....
Erie	2½	.....	34x4	36x5	Buda	4-4½x5½	Bosch	.....	Pierce	Strom.	.....	.....	worm	Timkn.	.....
Erie	3½	.....	36x5	40x5d	Buda	4-4½x5½	Bosch	.....	Pierce	Strom.	.....	.....	worm	Timkn.	.....
Fageol	1½	.....	34x3½	34x6	Wauk.	4-3½x5½	Dixie	opt.	Wauk.	Zenith	B.&B.	Own	worm	Stand.	Ross
Fageol	2½	.....	36x4	36x7	Wauk.	4-4½x5½	Dixie	opt.	Wauk.	Zenith	B-Lipe	Own	worm	Timkn.	Ross
Fageol	3½	.....	36x5	36x5d	Wauk.	4-4½x6½	Dixie	opt.	Wauk.	Zenith	B-Lipe	Own	worm	Timkn.	Ross
Fageol	5	5,300	36x6	40x6d	Wauk.	4-4½x6½	Dixie	opt.	Wauk.	Zenith	B-Lipe	Own	worm	Timkn.	Ross
Famous B-10	1	.....	36x3½	36x4	Cont.	4-3½x5	Eise.	.....	Mon.	Strom.	Fuller	Fuller	in-g.	Clark	Ross
Famous B-12	1½	.....	36x3½	36x5	Cont.	4-3½x5	Eise.	.....	Mon.	Strom.	Fuller	Fuller	in-g.	Clark	Ross
Fargo P	2	2,200	36x4	36x6	Cont.	4-3½x5	Bosch	none	Mon.	Ray.	Fuller	Fuller	in-g.	Russel	Jacox
Federal SD	1	2,500	35x5*	36x6*	Cont.	4-3½x5	Eise.	A-L	Pharo	Zenith	B.&B.	Own	worm	Timkn.	Gem.
Federal TE	1½	2 725	36x3½	36x5	Cont.	4-4½x5½	Eise.	opt.	Pharo	Zenith	B.&B.	Own	worm	Timkn.	Gem.
Federal UE	2	3,025	36x4	36x7	Cont.	4-4½x5½	Eise.	opt.	Pharo	Zenith	B.&B.	Own	worm	Timkn.	Gem
Federal Trac	3	3,050	36x4	36x7	Cont.	4-4½x5½	Eise.	opt.	Pharo	Zenith	B.&B.	Own	worm	Timkn.	Gem
Federal WD	3½	3,850	36x5	36x5d	Cont	4-4½x5½	Eise.	opt.	Pharo	Zenith	B.&B.	Own	worm	Timkn.	Gem
Federal XC	5	4,600	36x6	40x6d	Cont.	4-4½x5½	Eise.	opt.	Pharo	Zenith	B.&B.	Own	worm	Timkn.	Gem
Federal Trac	7	4,025	36x5	36x5d	Cont	4-4½x5½	Eise.	opt.	Pharo	Zenith	B.&B.	Own	worm	Timkn.	Gem
Ford TT	1	600	30x3½*	32x4½*	Own	4-3½x4	Own	.....	.....	opt.	Own	Own	worm	Own	Own
Forschler	1	2,100	36x3	36x4	Cont.	4-3½x5	Bosch	.....	Duplx.	Zenith	Fuller	Fuller	worm	Shel.	Ross
Forschler	1½	2,375	36x3½	36x5	Cont.	4-3½x5	Bosch	.....	Duplx.	Zenith	Fuller	Fuller	worm	Shel.	Ross
Forschler	2	2,750	36x4	36x7	Cont.	4-4½x5½	Bosch	.....	Duplx.	Zenith	Fuller	Fuller	worm	Shel.	Ross
Forschler	3	3,450	36x4	36x8	Cont.	4-4½x5½	Bosch	.....	Duplx.	Zenith	Fuller	Fuller	worm	Shel.	Ross
F. W. D. B	3	4,500	36x6	36x6	Wis.	4-4½x5½	Eise.	.....	Pierce	Strom.	M.&E.	Cotta	bevel	Own	Ross
Fulton FX	1½	1,850	34x3½	34x5	H-S	4-3½x5½	Simms	.....	.....	Carter	B.&B.	Own	in-g.	Russel	Lavn.
Fulton C	2	2,350	34x4	34x6	H-S	4-3½x5	Simms	.....	.....	Carter	B.&B.	Covert	in-g.	Russel	Lavn.
Gabriel C	1	2,000	35x5	35x5	Buda	4-4½x5½	Bosch	L-N	none	Ray.	B.&B.	B-Lipe	worm	Timkn.	Gem.
Gabriel E	2	3,250	36x4*	36x7*	Buda	4-4½x5½	Bosch	L-N	Dyplx.	Ray.	B.&B.	B-Lipe	worm	Timkn.	Gem.
Gabriel F	4	4,300	36x5	40x6d*	Buda	4-4½x6	Bosch	L-N	Duplx.	Ray.	B.&B.	B-Lipe	worm	Timkn.	Gem.
Garford 25	1¼	2,090	36x3½	36x4	Buda	4-3½x5½	Split.	West.	Mon.	Strom.	B-Lipe	Own	worm	Timkn.	Ross
Garford 70-H	2	3,450	36x4	36x7	Buda	4-4½x5½	Split.	West.	Duplx.	Strom.	B-Lipe	Own	worm	Timkn.	Ross
Garford 77-D	3½	4,390	36x5	36x5d	.....	4-4½x6	Split.	.....	Duplx.	Strom.	.....	Own	worm	Timkn.	Ross
Garford 68	5	5,200	36x5	40x6d	Wis.	4-4½x5½	Eise.	West.	Duplx.	Ray.	B-Lipe	Own	chain	Own	Ross
Garford 69	6	5,000	36x5	40x7d	Wis.	4-5 ½x5½	Eise.	West.	Duplx.	Ray.	B-Lipe	Own	chain	Own	Ross
Gary F	1	2,100	36x3½	36x4	Buda	4-3½x5	Eise.	.....	McCan.	Master	Fuller	Fuller	worm	Timkn.	Ross.
Gary GT	1½	2,550	36x3½	36x5	Buda	4-4x5½	Eise.	.....	McCan.	Master	Fuller	Fuller	worm	Timkn.	Ross
Gary J	2½	3,150	36x4	36x7	Buda	4-4½x5½	Eise.	.....	McCan.	Malter	Fuller	Fuller	worm	Timkn.	Ross
Gary KT	3½	4,050	36x5	40x5d	Buda	4-4½x6	Eise.	.....	McCan.	Master	B-Lipe	B-Lipe	worm	Timkn.	Ross
Gary M	5	5,150	36x6	40x6d	Buda	4-5x6½	Eise.	.....	McCan.	Master	B-Lipe	B-Lipe	worm	Timkn.	Ross
Gersix M	1½	2,850	36x3½	36x6	Buda	4-4x5½	Bosch	.....	Mon.	Strom.	B.&B.	Cotta	worm	Own	Ross
Gersix K	2½	3,350	36x4	36x7	Buda	4-4½x5½	Bosch	.....	Mon.	Strom.	B.&B.	Cotta	worm	Own	Ross
Gersix L	3½	4,350	36x5	40x5d	Buda	4-4½x6	Bosch	.....	Mon.	Strom.	B.&B.	Cotta	worm	Own	Ross
Giant 15	1	1,950	34x3½	34x5	Cont.	4-3½x5	Eise.	.....	.....	.....	Scheb.	B-Lipe	B-Lipe	worm	Shel.	Jacx.
Giant 14	1½	2,375	34x3½	34x5	Cont.	4-3½x5	Eise.	.....	.....	.....	Scheb.	B-Lipe	B-Lipe	worm	Shel.	Jacx.
Giant 16	2	2,850	36x4	36x7	Cont.	4-4½x5½	Eise.	.....	.....	.....	Scheb.	B-Lipe	B-Lipe	worm	Shel.	Ross
Giant 17	3½	3,850	36x5	36x5d	Cont.	4-4½x5½	Eise.	.....	Pierce	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
G. M. C. 16	½	.....	35x5*	35x5*	Cont.	4-3½x5	Eise.	.....	Mon.	Marvel	Own	Own	bevel	.....	Jacx.
G. M. C. 31	1½	.....	36x3½	36x5	Cont.	4-3½x5	Eise.	.....	Mon.	Marvel	Own	Own	worm	Timkn.	Jacx.
G. M. C. 41	2	.....	36x4	36x7	Cont.	4-4½x5½	Eise.	.....	Mon.	Marvel	Own	Own	worm	Timkn.	Jacx.
G. M. C. 71	3½	.....	36x5	40x5d	Cont.	4-4½x5½	Eise.	.....	Mon.	Marvel	Own	Own	worm	Timkn.	Jacx.
G. M. C. 101	5	.....	36x6	40x6d	Cont.	4-4½x5½	Eise.	.....	Mon.	Marvel	Own	Own	worm	Timkn.	Jacx.
Graham A	1½	2,295	35x5	36x6	Cont.	4-3½x4	Eise.	.....	Mon.	Strom.	Fuller	Fuller	in-g.	Torbn.	Lavn
Gramm-Bernstein 15	1½	.....	36x3½	36x5	Cont.	4-3½x5	N. E.	N. E.	.....	Strom.	Fuller	Fuller	in-g.	Clark	Ross

Abbreviations: **Engine**—Wauk., Waukesha; Cont., Continental; H-S, Herschell-Spillman; Lyc., Lycoming; N.A., North American; Herc., Hercules; Mil., Milwaukee; Wis., Wisconsin; LeR., LeRoi; GBS, Golden, Belknap & Swartz; Bea., Beaver. **Ignition**—Eise., Eisemann; A-K, Atwater Kent; Koko., Kokomo; Split., Splitdorf; Conn., Connecticut; Lau., Lauraine; Berl., Berling; A-L, Auto-Lite. **Electric Lighting**—Nlite, Nicolite; G&D, Gray & Davis; A-L, Auto-Lite; Dneto., Dyneto; Al-Ch., Allis-Chalmers; West, Westinghouse; L-N, Lecce Neville; Det., Detroit; N-E, North East; Wag., Wagner; Asterisk, electric starting also. **Governor**—Wauk., Waukesha; Duplx., Dulepx; Cont., Continental; Mon., Monarch; Simplx, Simplex; McCan., McCanna; Rugles, Ruggles. **Carburetor**—Scheb., Schebler; Strom., Stromberg; Ray., Rayfield; King., Kingston; Mon., Monarch; Shake., Shakespear; Car., Carter; Flech., Fletcher; Holl., Holley; Ens., Ensign; Mast., Master; John., Johnson; Stew., Stewart; Till., Tillotson; Asterisk, vacuum fuel feed. **Clutch**—B.&B., Borg & Beck; B-Lipe Brown-Line; Det., Detroit; H-Shaw, Hele-Shaw; Mech., Mechanics; M&E, Merchant & Evans; Lyc., Lycoming; W. G. Co., Warner Gear Co. **Gearset**—B.Lipe, Brown-Lipe; G-Lees, Grant-Lees; Det., Detroit; Mech., Mechanics; Cover., Covert; Savg., Savage Arms; W. G. Co., Warner Gear Co. **Final Drive**—in-g., internal gear; d-rd., double reduction; s-bev., spiral bevel; ext-g., external gear. **Axle**—Timkn., Timken; Torbn, Torbenson; Key-H., Keystone-Hindley; Shel., Sheldon; Salsby., Salisbury; Ind., Industrial; Chego., Chicago-Standard; Chgo., Chicago; W-W., Walker-Weiss; Emp., Empire. **Steering Gear**—Gem., Gemmer; Lavn., Lavine; Warn. Warner; Ditw., Ditweiler; Jacx., Jacox; Fost., Foster; Wol., Wohlrab. **Tires**—Asterisk, pneumatic.

Name and Model	Tons apacity	Chassis Price	Front Tires	Rear Tires	Nam of Engine	No Cyl, Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
Brockway S-2	1½	2,250	36x3½	36x5	Cont.	4-3½x5	Eise.	none	none	Strom.	B-Lipe	B-Lipe	worm	Shel.	Gem.
Brockway K-4	2½	3,200	36x4	36x7	Cont.	4-4½x5½	Eise.	none	none	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Brockway R-2	3½	4,100	36x5	36x5d	Cont.	4-4½x5½	Eise.	none	none	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Brockway T	5	5,250	36x6	40x6d	Cont.	4-4½x6	Eise.	.....	Duplx.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Champion	...	1,000	32x4	32x4	Light	4-3½x4½	A-K	.....	none	.....	.....	.....	bevel	.....	.....
Chevrolet T	1	1,325	33x4	35x5*	Own	4-3 ½x5½	Remy	A-L*	Mon.	Zenith	Own	Warner	worm	.....	Warn.
Clydesdale	1	.....	34x3½	34x5	Cont.	4-3½x5	Bosch	.....	Own	Zenith	B-Lipe	B-Lipe	worm	S.P.	Ross
Clydesdale 42	1½	2,445	36x3½	36x6	Cont.	4-3½x5	Bosch	.....	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Clydesdale 65X	2½	3,200	36x4	36x8	Cont.	4-4½x5½	Bosch	.....	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Clydesdale 90	3½	4,075	36x5	40x10	Cont.	4-4½x5½	Bosch	.....	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Clydesdale 120B	5	5,025	36x6	40x12	Cont.	4-4½x6	Bosch	.....	Own	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Collier 18	1	.....	34x4	34x5	Cont.	4-3½x5	Eise.	.....	Mon.	Zenith	Fuller	Fuller	worm	Chego.	Ross
Collier 19	1½	.....	36x6	36x6	Cont	4-3½x5	Eise.	.....	Mon.	Zenith	Fuller	Fuller	worm	Chego.	Ross
Collier 20	2	.....	36x4	36x7	Cont.	4-4½x5½	Eise.	.....	Mon.	Zenith	Fuller	Fuller	worm	Chego.	Ross
Columbia F	1	1,750	34x3½	34x4	Cont.	4-3½x5	Dixie	.....	Pierce	Shake.	B.&B.	Covert	in-g.	Russel	Own
Columbia H	1½	2,200	34x3½	34x5	Hink.	4-3½x5½	Bosch	.....	Hink.	Strom.	Det.	Covert	in-g.	Russel	.....
Columbia G	2½	2,750	36x4	36x7	Hink.	4-4 x5½	Bosch	Remy	Hink.	Strom.	Det.	Covert	in-g.	Russel	Own
Comet	1½	1,950	34x4	34x4	Lyc.	4-3½x5	Delco.	Dneto.	.....	Carter	B.&B.	Muncie	worm	Chego.	C.A.S
Commerce E	1	1,855	34x3	34x4	Cont.	4-3½x5	Eise.	Bijur*	none	Zenith *	Det.	Det.	in-g.	Torbn.	Jacox
Commerce EP	2	2,225	36x6	36x6	Cont.	4-3½x5	Eise.	Bijur*	none	Zenith *	Det.	Det.	in-g.	Torbn.	Jacox
Concord A	1½	2,350	36x3½	36x5	Buda	4-3½x5½	Eise.	.....	Mon.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Concord B	2½	2,850	36x4	36x4d	Buda	4-4½x5½	Eise	.....	Mon.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Conestoga 12	½	.....	32x4½	32x4½	Cont.	4-3½x5	Simms	.....	.....	Strom.	B.&B.	Muncie	in-g.	Torbn.	C.A.S.
Conestoga 20	1	2,100	34x3½	34x5	Cont.	4-3½x5	Simms	.....	.....	Strom.	Fuller	Fuller	worm	Wis.	Ross
Conestoga 30	2	2,700	36x4	36x4d	Cont.	4-3½x5	Simms	.....	Dplx.	Strom.	Fuller	Fuller	worm	Wis.	Ross
Corbitt E	1	2,400	34x3½	34x4	Cont.	4-3½x5	Eise.	Disco*	Simplx.	Strom.	Fuller	Fuller	worm	Shel.	Ross
Corbitt D	1½	2,800	36x3½	36x5	Cont.	4-3½x5	Eise.	Disco*	Simplx.	Strom.	Fuller	Fuller	worm	Shel.	Ross
Corbitt C	2	3,500	..x4	36x7	Cont.	4-4½x5½	Eise.	none	Simplx.	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Corbitt B	2½	3,650	36x4	36x7	Cont.	4-4½x5½	Eise.	none	Simplx.	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Corbitt A	3½	4,500	36x5	36x5d	Cont.	4-4½x5½	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Corbitt AA	5	5,500	36x6	40x6d	Cont.	4-4½x6	Eise.	none	Pierce	Strom.	Detlaff	B-Lipe	worm	Shel.	Ross
Dart H	1	2,100	34x3½	34x5	Buda	4-3½x5½	Eise.	Bijur*	Pierce	Zenith	Fuller	Fuller	worm	Own	Ross
Dart S	1½	2,250	34x3½	34x6	Buda	4-3½x5½	Eise.	Bijur*	Pierce	Zenith	Fuller	Fuller	worm	Own	Ross
Dart M	2½	3,000	36x4	36x7	Buda	4-4½x5½	Eise.	Bijur*	Pierce	Zenith	Fuller	Fuller	worm	Own	Ross
Dart W	3½	4,000	36x5	36x10	Buda	4-4½x6	Eise.	Bijur*	Pierce	Zenith	Fuller	Fuller	worm	Own	Ross
Day-Elder A	1	1,995	34x3	34x4	Cont.	4-3½x5	Eise.	.....	.....	Zenith	Covert	Covert	worm	Shel.	Gem.
Day-Elder B	1½	2,300	34x3½	34x5	Cont.	4-3½x5	Eise.	.....	.....	Zenith	Covert	Covert	worm	Shel.	Gem.
Day-Elder D	2	2,750	36x4	36x7	Cont.	4-4½x5½	Eise.	.....	Mon.	Zenith	Covert	Covert	worm	Shel.	Gem.
Day-Elder C	2½	2,950	36x4	36x7	Buda	4-4½x5½	Eise.	.....	Mon.	Zenith	Covert	Covert	worm	Shel.	Gem.
Day-Elder F	3½	3,700	36x5	36x5d	Cont.	4-4½x5½	Eise.	.....	Mon.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Gem.
Day-Elder E	5	4,600	36x5	40x6d	Buda	4-4½x6	Eise.	.....	Mon.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Gem.
Dearborn, F	1½	1,980	34x4*	34x5	Cont.	4-3½x5	Bosch	.....	.....	Strom.	Fuller	Fuller	worm	Stand.	Lavn.
Dearborn, 48	2	2,390	34x4½	34x7	Buda	4-3½x5½	Bosch	.....	.....	Strom.	Fuller	Fuller	worm	Stand.	Det.
Defiance, D	1½	2,450	35x5	36x6	Cont.	4-3½x5	Eise.	.....	none	Strom.	B.&B.	G-Lees	in-g.	Torbn.	Own
Defiance, E	2	2,650	35x5	38x7	Cont.	4-3½x5	Eise.	.....	none	Strom.	B.&B.	G-Lees	in-g.	Torbn.	Own
DeKalb, E-2	2	2,100	34x3½	36x5	Cont.	4-4½x5½	Eise.	none	none	Master	Fuller	Fuller	worm	Timkn.	Ross
DeKalb, E-2½	2½	2,600	36x4	36x6	Cont.	4-4½x5½	Eise.	none	none	Master	Fuller	Fuller	worm	Timkn.	Ross
Denby, 12	1	2,400	35x5	36x6	Cont.	4-3½x5	Eise.	none	Mon.	Strom.	Fuller	Fuller	in-g.	Russel	Ross
Denby, 134	2	2,800	36x3½	36x6	Cont.	4-3½x5	Eise.	none	Mon.	Strom.	Fuller	Fuller	in-g.	Russel	Ross
Denby, 25	3	3,600	36x4	36x7	Cont.	4-4½x5½	Eise.	none	Mon.	Strom.	Fuller	Fuller	in-g.	Russel	Ross
Denby, 27	4	4,600	36x5	36x5d	Cont.	4-4½x5½	Eise.	.....	Simplx.	Strom.	Own	Warner	in-g.	Clark	Ross
Denby, 210	5	5,350	36x6	40x6d	Cont.	4-4½x5½	Eise.	.....	Simp.	Strom.	Own	Warner	in-g.	Clark	Ross
Dependable	1½	2,150	34x3½	34x5	Buda	4-3½x5½	Dixie	.....	Pierce	Strom.	Fuller	Fuller	worm	Wis.	Ross
Dependable	2½	2,750	36x4	36x7	Buda	4-4½x5½	Dixie	.....	Pierce	Zenith	Fuller	Fuller	worm	Wis.	Roas
Diamond-T, FS	1½	2,715	36x3½	36x5	Own	4-3½x5½	Bosch	.....	Own	Strom.	Covert	Covert	worm	Wis.	Gem.
Diamond-T, U	2	2,835	36x4	36x7	Own	4-4 x5½	Bosch	.....	Own	Strom.	Covert	Covert	worm	Timkn.	Gem.
Diamond-T, K	3½	3,925	36x5	36x5d	Own	4-4½x5½	Bosch	.....	Own	Strom.	Covert	Covert	worm	Timkn.	Gem.
Diamond-T, S	5	4,800	36x6	40x6d	.....	4-4½x6	Bosch	.....	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Diehl, A	1	1,575	34x4½	35x5	Cont.	4-3½x5	Bosch	Presto	none	Zenith	B.&B.	Durstn.	in-g.	Torbn.	Jacox.
Doane	2	3,750	36x5	36x7	Wauk.	4-4½x5½	Bosch	.....	.....	Master	B-Lipe	B-Lipe	Chain	Own	Own
Doane	6	5,825	36x6	40x6d	Wauk.	4-4½x6½	Bosch	none	Wauk.	Master	B-Lipe	.....	Chain	Own	Lavn.
Dodge	½	.....	32x3½	32x3½	Own	4-3½x4½	Own	N.E.	none	Stew.	Own	Own	.....	Own	Own
Dorris, K4	2	3,400	36x4	36x7	Own	4-4½x5½	Bosch	West.*	Own	Strom.	W.G.Co	W.G.Co	worm	Timkn.	Ross
Dorris, K7	3	4,400	36x5	36x10	Own	4-4½x5½	Bosch	West.*	Own	Strom.	W.G.Co	W.G.Co	worm	Timkn.	Ross
Douglas G	1½	2,200	35x5	36x6	Weid	4-3½x5½	Eise.	none	Pierce	Scheb.	Fuller	.....	in-g.	Torbn.	Ross
Douglas H	2	2,800	34x4	36x7	Buda	4-4 x5½	Eise.	none	Pierce	Scheb.	Fuller	.....	in-g.	Torbn.	Ross
Douglas I	3	3,500	36x6	40x8	Buda	4-4½x5½	Eise.	none	Pierce	Scheb.	Fuller	.....	worm	Wis.	Ross

Name and Model	Tons Capacity	Chassis Trice	Front Tires	Rear Tires	Name of Engine	No. Cyl., Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
Gramm-Bernstein 65	1½	.....	36x3½	36x5	Cont.	4-3½x5	N. E.	N. E.	.....	Strom.	Fuller	Own	worm	Stan-P	Ross
Gramm-Bernstein 20	2	.....	36x4	36x7	Cont.	4-4½x5½	N. E.	N. E.	.....	Strom.	Fuller	Own	worm	Shel.	Ross
Gramm-Bernstein 25	2½	.....	36x4	36x4d	Hink.	4-4½x5½	Eise.	N. E.	.....	Strom.	Own	Own	worm	Stan-P	Ross
Gramm-Bernstein 35	3½	.....	36x5	40x5d	Hink.	4-4½x5½	Eise.	N. E.	.....	Strom.	Own	Own	worm	Stan-P	Ross
Gramm-Bernstein 50	5	.....	36x6	40x6d	Cont.	4-4½x6	Eise.	N. E.	Hink.	Strom.	Own	Own	worm	Stan-P	Ross
Grant 17	1½	2 675	35x5	38x7	Cont.	4-3½x5	Split.	Remy	Pierce	Car.*	B-Lipe	B-Lipe	in-g.	Torbn.	Jacx.
Hahn J-4	1	.....	36x3½	36x5	Cont.	4-3½x5	Opt.	.....	Pierce	Opt.	B-Lipe	B-Lipe	worm	Shel.	Ross
Hahn CD	1½	.....	36x3½	36x6	Cont.	4-4½x5½	Opt.	.....	Pierce	Opt	B-Lipe	B-Lipe	worm	Timkn.	Ross
Hahn DE	2	.....	36x4	36x7	Cont.	4-4½x5½	Opt.	.....	Pierce	Opt.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Hahn EE	2½	.....	36x4	36x8	Cont.	4-4½x5½	Opt.	.....	Pierce	Opt.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Hahn F	3½	.....	36x5	36x10	Cont	4-4½x5½	Opt.	.....	Pierce	Opt.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Hahn FE	5	.....	36x6	40x12	Cont.	4-4½x6	Opt.	.....	Pierce	Opt	B-Lipe	B-Lipe	worm	Timkn.	Ross
Hal-Fur D	1	2,000	35x5	35x5	Hink.	4-4x5½	Bosch	West.	Duplx.	Strom.	B.&B.	B-Lipe	worm	Timkn.	Gem.
Hal-Fur B	2½	2,750	35x5	36x7	Hink.	4-4½x5½	Bosch	none	Duplx.	Strom.	B.&B.	B-Lipe	worm	Timkn.	Gem.
Hall	2	2,875	36x4	36x4d	Cont.	4-4½x5½	Bosch	.....	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem
Hall	3½	3,750	36x5	36x5d	Cont.	4-4½x5½	Bosch	.....	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Hall	5	4,850	36x5	40x6d	Cont.	4-4½x5½	Bosch	.....	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Hall	7	4,850	36x5	40x6d	Cont.	4-4½x5½	Bosch	.....	Duplx.	Zenith	B-Lipe	B-Lipe	chain	Timkn.	Gem.
Harvey WEA	1½	2,550	34x3½	34x5	Buda	4-4½x5½	Bosch	.....	Mon.	Zenith	Fuller	Fuller	worm	Shel.	Ross
Harvey WFA	2½	3,300	36x4	36x7	Buda	4-4½x5½	Eise.	.....	Duplx.	Strom.	B.&B.	B-Lipe	worm	Shel.	Ross
Harvey WHA	3½	4,300	36x5	36x5d	Buda	4-4½x6	Eise.	.....	Duplx.	Strom.	B.&B.	B-Lipe	worm	Shel.	Ross
Harvey WKA	5	5,200	36x6	40x6d	Buda	4-4½x6	Eise.	.....	Duplx.	Strom.	B.&B.	B-Lipe	worm	Shel.	Ross
Hawkeye K	1½	1,995	34x3½	34x5	Buda	4-3½x5½	Eise.	.....	Simplx.	Zenith	Fuller	Fuller	in-g.	Clark	Ross
Hawkeye M	2	2,650	36x4	36x6	Buda	4-4½x5½	Eise.	West.	Simplx.	Zenith	Fuller	Fuller	in-g.	Clark	Ross
Hendrickson	2½	3,200	36x4	36x7	Buda	4-4½x5½	.....	.....	.....	Strom.	Fuller	.....	worm	Timkn.	Ross
Hendrickson	3½	4,000	36x5	36x5d	Buda	4-4½x5½	.....	.....	.....	Strom.	Fuller	.....	worm	Timkn.	Ross
Hendrickson	5	5,250	36x6	40x6d	.....	4-5x6	.....	.....	.....	Strom.	.....	.....	worm	Timkn.	Ross
Highway Kn't A	4	5,000	36x5	36x6	Knight	4-4x6	Eise.	Wag.	Mon.	Zenith	.....	.....	worm	Shel.	Ross
Highway Kn't	5	5,800	36x5	40x6d	Knight	4-4x6	Eise.	Wag.	Mon.	Zenith	.....	.....	worm	Shel.	Ross
Huffman C	1½	1,695	34x3½	34x6	Buda	4-3½x5	Dixie	.....	.....	Zenith	Fuller	Fuller	worm	Torbn.	Lavn.
Huffman B	1½	1,895	34x3½	34x6	Cont.	4-3½x5	Dixie	.....	.....	Zenith	Fuller	Fuller	worm	Chgo.	Lavn.
Hurlburt A	1½	2,850	34x4	34x5	Buda	4-4½x5½	Eise.	Vesta	Duplx.	Flech.	B-Lipe	B-Lipe	worm	Own	Ross
Hurlburt B	2½	3,750	36x4	36x4d	Buda	4-4½x5½	Eise.	Vesta	Duplx.	Flech.	B-Lipe	B-Lipe	worm	Own	Ross
Hurlburt C	3½	4,400	36x5	36x5d	Buda	4-4½x6	Eise.	Vesta	Duplx.	Flech.	B-Lipe	B-Lipe	worm	Own	Ross
Hurlburt D	5½	5,250	36x5	40x6	Buda	4-4½x6	Eise.	Vesta	Duplx.	Flech.	B-Lipe	B-Lipe	worm	Own	Ross
Independent F	1–2	.....	36x3½	36x5	Cont.	4-3½x5	Eise.	.....	Pierce	Scheb.	Fuller	Fuller	worm	Wis.	Ross
Indiana 12	1½	2,290	34x3½	34x5	Wauk.	4-3½x5½	Eise.	West.	Wauk.	Strom.	B.&B.	Covert	worm	Shel.	Wol.
Indiana 20	2	2,950	36x4	36x7	Ruten.	4-4½x5½	Eise.	West.	Pierce	Strom.	B.&B.	B-Lipe	worm	Shel.	Wol.
Indiana 25	2½	3,150	36x4	36x8	.....	4-4½x5½	.....	.....	.....	.....	.....	.....	worm	.....	.....
Indiana 35	3½	3,750	36x5	36x5d	Ruten.	4-4½x5½	Eise.	West	Pierce	Strom.	B.&B.	B-Lipe	worm	Shel.	Wol.
Indiana 50	5	4,775	36x5	40x6d	Wauk.	4-4½x6½	Eise.	West.	Wauk.	Strom.	B.&B.	B-Lipe	worm	Shel.	Wol.
International H	¾	1,750	36x3½	36x3½	Own	4-3½x5½	Bosch	N. E.*	Own	Ens.	Own	Own	in-g.	Own	Own
International F	1	1,950	36x3½	36x4	Own	4-3½x5½	Bosch	N. E.*	Own	Ens.	Own	Own	in-g.	Own	Own
International K	1½	2,300	36x3½	36x5	Own	4-3½x5½	Bosch	N. E.*	Own	Ens.	Own	Own	in-g.	Own	Own
International G	2	2,700	36x4	36x6	Own	4-4½x5	Split.	N. E.*	Own	Ens.*	Own	Own	in-g.	Own	Own
International L	3½	4,500	36x5	40x10	Own	4-4½x5	Split.	N. E.*	Own	Ens.*	Own	B-Lipe	in-g.	Own	Own
Jackson C	3½	4,250	36x7	36x7	Cont.	4-4½x5½	Eise.	Eise.	Pierce	Strom.	B.&B.	Own	bevel	Own	Ross
Jumbo 15	1½	2,850	36x3½	36x5	Buda	4-3½x5½	N. E.	N. E.	none	Zenith	Fuller	Fuller	in-g.	Clark	Jacx.
Jumbo 20	2	3,100	35x5	38x7	Buda	4-3½x5½	Eise.	N. E.	none	Zenith	Fuller	Fuller	in-g.	Clark	Jacx.
Jumbo 25	2½	3,450	36x4	36x7	Buda	4-4½x5½	Eise.	Eise.	Duplx.	Zenith	Fuller	Fuller	in-g.	Clark	Jacx.
Jumbo 30	3	3,950	36x6	42x9	Buda	4-4½x5½	Eise.	Eise.	Duplx.	Zenith	Fuller	Fuller	in-g.	Clark	Jacx.
Jumbo 35	3½	4,550	36x6	36x10	Buda	4-4½x6	Eise.	Eise.	Simplx.	Zenith	B-Lipe	B-Lipe	in-g.	Clark	Jacx.
Jumbo 40	4	5,200	38x7	44x10	Buda	4-4½x6	Eise.	Eise.	Simplx.	Zenith	B-Lipe	B-Lipe	in-g.	Clark	Jacx.
Kalamazoo G	1½	.....	34x4	34x5	Cont.	4-3½x5	Bosch	Dneto.	Pierce	Strom.	Fuller	Fuller	worm	Wis.	Ross
Kalamazoo H	2½	.....	34x5	36x7	Wis.	4-4x6	Bosch	Dneto.	Pierce	Strom.	Fuller	Fuller	worm	Shel.	Ross
Kalamazoo K	3½	.....	36x5	36x5d	Wis.	4-4½x6	Bosch	Dneto.	Pierce	Strom.	Fuller	Fuller	worm	Shel.	Ross
Kankakee E	2½	2,875	34x4	36x6	Cont.	6-3½x5½	Delco	Delco	.....	Zenith	Warner	Warner	in-g.	Russel	Ross
Kearns	½	1,550	32x4½	32x4½	Light	4-3½x4½	Berl.	Dyn.	Mon.	Zenith	B.&B.	G-L	in-g.	Torbn.	Lavn.
Kearns	1½	2,100	34x3½	34x6	H-S	4-3½x5	Berl.	none	Pierce	Zenith	B.&B.	G-L	in-g.	Torbn.	Lavn.
Keldon, 19	2	2,885	36x4	36x7	Buda	4-4½x5½	Eise.	none	Pierce	Strom.	Fuller	Fuller	in-g	Russel	Ross
Kelly-S, K-31	1½	3,000	36x3½	36x6 *	Own	4-3½x5½	Eise.	opt.*	Pierce	Zenith	Own	Covert	Chain	Own	Gem.
Kelly-S., K-32	1½	3,000	36x3½	36x6	Own	4-3½x5½	Eise.	opt.*	Pierce	Zenith	Own	Covert	worm	Own	Gem.

Abbreviations: **Engine**—Wauk., Waukesha; Cont., Continental; H-S, Herschell-Spillman; Lyc., Lycoming; N.A., North American; Herc., Hercules; Mil., Milwaukee; Wis., Wisconsin; LeR., LeRoi; GBS, Golden, Belknap & Swarts; Bea., Beaver. **Ignition**—Eise., Eisemann; A-K, Atwater Kent; Koko., Kokomo; Split., Splitdorf; Conn., Connecticut; Lau., Lauraine; Berl., Berling; A-L, Auto-Lite. **Electric Lighting**—Nlite, Nicolite; G&D, Gray & Davis; A-L, Auto-Lite; Dneto., Dyneto; Al-Ch., Allis-Chalmers; West, Westinghouse; L-N, Leece Neville; Det., Detroit; N-E, North East: Wag., Wagner; Asterisk, electric starting also. **Governor**—Wauk., Waukesha; Duplx., Duplex; Cont., Continental; Mon., Monarch; Simplx, Simplex; McCan., McCanna; Rugles, Ruggles. **Carburetor**—Scheb., Schebler; Strom., Stromberg; Ray., Rayfield; King., Kingston; Mon., Monarch; Shake., Shakespeare; Car., Carter; Flech., Fletcher; Holl., Holley; Ens., Ensign; Mast., Master; John., Johnson; Stew., Stewart; Till., Tillotson; Asterisk, vacuum fuel feed. **Clutch**—B.&B., Borg & Beck; B-Lipe Brown-Lipe; Det., Detroit; H-Shaw, Hele-Shaw; Mech., Mechanics; M&E, Merchant & Evans; Lyc., Lycoming; W. G. Co., Warner Gear Co. **Gearset**—B.Lipe, Brown-Lipe; G-Lees, Grant-Lees; Det., Detroit; Mech., Mechanics; Cover., Covert; Savg., Savage Arms; W. G. Co., Warner Gear Co. **Final Drive**—in-g., internal gear; d-rd., double reduction; s-bev., spiral bevel; ext-g., external gear. **Axle**—Timkn., Timken; Torbn, Torbenson; Key-H., Keystone-Hindley; Shel., Sheldon; Salsby., Salisbury Ind., Industrial; Chego., Chicago-Standard; Chgo., Chicago; W-W., Walker-Weiss; Emp., Empire. **Steering Gear**—Gem., Gemmer; Lavn., Lavine; Warn., Warner; Ditw., Ditweiler; Jacx., Jacox; Fost., Foster; Wol., Wohlrab. **Tires**—Asterisk, pneumatic.

Motor Age Monthly Guide to Truck Specifications—Continued

These tables are revised and brought up to date monthly

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Name of Engine	No. Cyl. Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
Kelly-S., K-35	2½	3,500	36x4	36x4d	Own	4-3½x5½	Eise.	opt.*	Pierce	Zenith	Own	Covert	Chain	Own	Gem.
Kelly-S., K-36	2½	3,500	36x4	36x4d	Own	4-3½x5½	Eise.	opt.*	Pierce	Zenith	Own	Covert	worm	Own	Gem.
Kelly-S., K-40	3½	4,400	36x4	40x5d	Own	4-4½x6½	Eise.	opt.*	Pierce	Ray.	Own	Covert	Chain	Own	Gem.
Kelly-S., K-45	4	4,500	36x5	40x6d	Own	4-4½x6½	Eise.	opt.*	Pierce	Ray.	Own	Covert	Chain	Own	Gem.
Kelly-S., K-50	5	5,150	36x6	40x6d	Own	4-4½x6½	Eise.	opt.*	Pierce	Ray.	Own	Covert	Chain	Own	Gem.
Kelly-S., K-60	6	5,500	36x6	40x7d	Own	4-4½x6½	Eise.	opt.*	Pierce	Ray.	Own	Covert	Chain	Own	Gem.
Keystone	1	1,375	31x4*	33x5*	Own	4-3½x4	A-L	.....		Tillot.	Own	Own	in-g.	Torbn.	Own
Keystone	2	2,100	35x5*	38x7*	Buda	4-3½x5½	Berl.	none	Pierce	Zenith	Fuller	Fuller	in-g.	Russel	Ross
Kimball, B	2	3,675	36x4	36x7	Wis.	4-4 x6	Eise.	.....	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Kimball, C	2½	3,975	36x4	36x7	Wis.	4-4½x6	Eise.	.....	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Kimball, K	3	4,400	36x4	36x8	Wis.	4-4½x5½	Berl.	.....	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Kimball, E	4	5,000	36x5	40x10	Wis.	4-5x5½	Berl.	.....	Duplx.	Zenith	Fuller	Fuller	worm	Shel.	Ross
Kimball, F	5	5,975	36x6	40x12	Wis.	4-5½x6	Berl.	.....	Duplx.	Zenith	Fuller	Fuller	worm	Shel.	Ross
Kissel	¾	2,175	34x4½*	34x4½	Own	4-3½x5½	Eise.	.....	Pierce	Strom.	W.G.Co	W.G.Co	.....	Own	Jacx.
Kissel	1½	2,975	36x3½	36x5	Own	4-3½x5½	Eise.	*	Pierce	Strom.	W.G.Co	W.G.Co	worm	Shel.	Jacx.
Kissel, Gen Utility	2	2,775	36x4	36x7	Own	4-4½x5½	Eise.	*	Pierce	Strom.	W.G.Co	W.G.Co	worm	Timkn.	Lavn.
Kissel	3½	4 475	36x5	36x5d	Own	4-4½x5½	Eise.	*	Pierce	Strom.	W.G.Co	W.G.Co	worm	Shel.	Ross
Kissel, Freighter	5	5,085	36x6	36x6d	Own	4-4½x5½	Eise.	*	Pierce	Strom.	W.G.Co	W.G.Co	worm	Shel.	Ross
Kimball, A	1½	3,075	36x3½	36x5	Wis.	4-4x5	Bosch	.....	Duplx.	Zenith	.....	B-Lipe	worm	Shel.	Lavn.
Kleiber, AA	1	.....	34x3½	34x5	Cont.	4-3½x5½	Bosch	.....	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Kleiber, A	1½	.....	36x3½	36x6	Cont.	4-4½x5½	Bosch	.....	Pierce	Strom.	H-Shaw	B-Lipe	worm	Shel.	Ross
Kleiber, BB	2	.....	36x4	36x3½d	Cont.	4-4½x5½	Bosch	.....	Pierce	Strom.	H-Shaw	B-Lipe	worm	Timkn.	Ross
Kleiber, B	2½	.....	36x5	36x4d	Cont.	4-4½x5½	Bosch	.....	Pierce	Strom.	H-Shaw	B-Lipe	worm	Shel.	Ross
Kleiber, C	3½	.....	36x5	36x5d	Cont.	4-4½x5½	Bosch	.....	Pierce	Strom.	H-Shaw	B-Lipe	worm	Timkn.	Ross
Knox, 35-Tractor	5	6,000	36x4	38x6d	Own	4-5 x5½	Berl.	G.&D.	None	Zenith	Own	Own	Chain	Own	Ross
Knox, 36-Tractor	10	6,500	36x4	38x6d	Own	4-5 x5½	Berl.	G.&D.	None	Zenith	Own	Own	Chain	Own	Ross
Koehler, C	1½	1,985	34x3	34x5	H-S	4-3½x5	Eise.	none	Simplx.	Zenith	Mech.	Mech.	in-g.	Torbn.	Own
Koehler, M	2½	3,365	36x4	36x7	Herc.	4-4 x5½	Eise.	none	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Lavn.
Koehler Trac.,MT	5	3,450	36x4	36x7	Herc.	4-4 x5½	Eise.	none	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Lavn.
Larrabee, U	1½	2,250	34x3½	34x5	Cont.	4-3½x5	Bosch	.....	Simplx.	Scheb.	B-Lipe	B-Lipe	worm	Shel.	Ross
Larrabee, EK&SK	2½	3,250	36x4	36x7	Cont.	4-4½x5½	Bosch	.....	Simplx.	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Larrabee, EL &SL	3½	4,000	36x5	36x5d	Cont.	4-4½x5½	Bosch	.....	Simplx.	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Larrabee, SW&EW	5	4,900	36x5	40x6d	Cont.	4-4½x5½	Bosch	.....	Simplx.	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Leudinghaus, KLS	2	2,790	36x4	36x7	Wauk.	4-4½x5½	Split.	.....	Wauk.	Scheb.	B.&B	Detroit	worm	Wis.	Lavn.
L. M. C	2½	2,950	36x4	36x4d	Cont.	4-4½x5½	Bosch	.....	Pierce	Strom.	B.&B.	.....	in-g.	Russel	.....
Lombard	7	.....	.....	.....	6-5½x7	Simms	.....	Own	Scheb.	.....	.....	.....	worm	.....	.....
Lorain	2	3,250	34x4	34x6	Wis.	4-4 x5	Swiss	.....	.....	Zenith	B.&B.	Cotta	in-g	Russel	Lavn.
Maccar, S	1	2,400	34x3½	34x4	Cont.	4-3½x5	Eise.	none	.....	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Maccar, L	1½	2,925	36x4	36x5	Cont.	4-4½x5½	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Maccar, H	2½	3,500	36x4d	36x4	Cont.	4-4½x5½	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Maccar, M	3½	4,300	36x5	36x5d	Wis.	4-4½x6	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Maccar, G	5½	5,250	36x5	40x6d	Wis.	4-5 x6	Eise.	.....	.....	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Mack, AB	1½	3,000	36x4	36x3½d	Own	4-4 x5	Dixie	none	Pierce	Zenith	B-Lipe	B-Lipe	Chain	Own	Gem.
Mack, AB	1½	3,000	36x4	36x3½d	Own	4-4 x5	Dixie	.....	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Mack, AB	2	3,300	36x4	36x4d	Own	4-4 x5	Dixie	.....	Own	Zenith	B-Lipe	B-Lipe	Chain	Own	Gem.
Mack, AB	2	3,300	36x4	36x4d	Own	4-4 x5	Dixie	.....	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Mack Trac., AB	5	3,400	36x4	36x4d	Own	4-4 x5	Dixie	.....	Own	Zenith	B-Lipe	B-Lipe	Chain	Own	Gem.
Mack , AC	3½	4,950	36x5	40x5d	Own	4-5 x6	Dixie	.....	Own	Zenith	Own	Own	Chain	Own	Gem.
Mack, AC	5	5,500	36x5	40x6d	Own	4-5 x6	Dixie	.....	Own	Zenith	Own	Own	Chain	Own	Gem.
Mack, AC	6	5,750	36x6	40x6d	Own	4-5 x6	Dixie	.....	Own	Zenith	Own	Own	Chain	Own	Gem.
Mack Trac., AC	7	4,950	36x5	40x7d	Own	4-5 x6	Dixie	.....	Own	Zenith	Own	Own	Chain	Own	Gem.
Mack AC	7½	6,000	36x7	40x7d	Own	4-5x6	Dixie	.....	Own	Zenith	Own	Own	chain	Own	Gem.
Mack Trac. AC	10	5,500	36x6	40x6d	Own	4-5x6	Dixie	.....	Own	Zenith	Own	Own	chain	Own	Gem.
Mack Trac. AC	13	5,750	36x6	40x12s	Own	4-5x6	Aero	.....	Own	Zenith	Own	Own	chain	Own	Gem.
Mack Trac. AC	15	6,000	36x7	40x7d	Own	4-5x6	Dixie	.....	Own	Zenith	Own	Own	chain	Own	Gem
Master JW	1½	2,690	34x3½	34x5	Buda	4-4½x5½	Eise.	opt.	McCan.	Mast.	Fuller	Fuller	worm	Timkn.	Ross
Master WL	2	3,390	34x4	36x7	Buda	4-4½x5½	Eise.	opt.	McCan.	Mast.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Master D	2½	3,540	34x4	36x7	Buda	4-4½x5½	Eise.	opt.	McCan.	Mast.	B-Lipe	B-Lipe	d-rd.	Walker	Ross
Master DL	2½	3,640	34x4	36x7	Buda	4-4½x5½	Eise.	opt.	McCan.	Mast.	B-Lipe	B-Lipe	d-rd.	Walker	Ross
Master W	2½	3,000	34x4	36x7	Buda	4-4½x5½	Eise.	opt.	McCan.	Mast.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Master A	3½	4,190	36x5	40x5d	Buda	4-4½x6	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Master AL	3½	4,290	36x5	40x5d	Buda	4-4 x6	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Master E	3½	4,690	36x5	40x5d	Buda	4-4½x6	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	d-rd.	Walker	Ross
Master EL	3½	4,740	36x5	40x5d	Buda	4-4 x6	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	d-rd.	Walker	Ross
Master B	5	5,290	36x6	40x6d	Buda	4-4½x6½	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Paige, 51-18	3½	4,150	36x5	36x5d	Cont.	4-4½x5½	Bosch	none	Simplx.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Jacx.
Parker, F20	2	3,500	34x4	36x4d	Wis.	4-4x6	Bosch	West.	Mon.	Strom.	B-Lipe	Fuller	worm	Own	Ross
Parker, J20	3½	4,400	36x5	40x5d	Wis.	4-4½x6	Bosch	West	Mon.	Strom.	B-Lipe	Warner	worm	Own	Ross
Parker, M20	5	5,500	36x6	40x6d	Wis.	4-4½x6	Bosch	West.	Simplx.	Strom.	B-Lipe	Warner	worm	Own	Ross
Patriot, Revere	¾	1,785	35x5*	35x5*	Cont.	4-3½x5	A-K	Bijur	.....	Strom.	B. & B.	Covert	worm	Empire	.....
Patriot, Lincoln	1½	2,450	34x3½	34x3½d	Hink.	4-4x5½	Split	.....	Hink.	Strom.	Covert	Fuller	worm	Empire	Ross
Patriot, Wash	2½	3,450	36x4	36x3½d	Hink.	4-4½x5½	.....	.....	Hink.	Strom.	Covert	Covert	worm	Empire	Ross
Pierce-Arrow	2	3,750	36x4	36x4d	Own	4-4x5½	Dixie	Vesta	Own	Own	Own	Own	worm	Own	Own
Pierce-Arrow	3½	4,950	36x5	36x5d	Own	4-4½x6½	Eise.	None	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Pierce-Arrow,R9	5	5,700	36x5	40x6d	Own	4-4½x6½	Dixie	Vesta	Own	Own	Own	Own	worm	Own	Own
Pioneer All Steel,F	2	2,790	36x4	36x7	Cont.	4-4½x5½	Eise.	None	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Pony	¼	320	28x3	28x3	Own	4-2½x4	A-K	opt.	opt.	Strom.	.....	.....	chain	Own	Own
Power, B	2	2,950	36x4	36x4d	Cont.	4-4½x5½	Simms	None	Pierce	Strom.	Fuller	Fuller	worm	Timkn.	Ross
Ranger, C	1½	2,575	34x3½	34x5	Wis.	4-3½x5	Dixie	.....	Duplx.	Zenith	.....	.....	.....	.....	Timkn.
Ranier, R-11	¾	1,850	34x4½	34x4½	Cont.	4-3½x5½	Simms	opt.	Mon.	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Lavn.
Ranier, R-9	1	2,050	32x3	32x4	Cont.	4-3½x5	Simms	opt.	Mon.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Lavn.
Ranier, R-6	1½	2,150	34x3	34x3	Cont.	4-3½x5½	Simms	opt.	Mon.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Lavn.
Ranier, R-8	2	2,650	34x4	34x6	Cont.	4-3½x5½	Simms	opt.	Mon.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Reliance, A-10	1½	2,500	36x3½	36x5	Buda	4-4x5½	Eise.	Eise.	Pierce	Strom.	Fuller	Fuller	ext-g	Badger	Ross
Reliance, B-20	2½	3,200	36x4	36x4d	Buda	4-4½x5½	Eise.	Eise.	Pierce	Strom.	Fuller	Cotta	ext-g	Badger	Ross
Reo, F	1½	1,385	34x4½	34x4½	Own	4-4x4½	Remy	Remy	none	John.	Own	Own	bevel	Own	Own
Republic, 10	1	.....	34x3	34x3	Cont.	4-3½x5	Eise.	none	Rugles	Strom.	Fuller	Fuller	in-g	Torbn.	Jacx.
Republic, 11X	1½	2,050	34x3½	34x5	Cont.	4-3½x5	Eise.	none	Rugles	Strom.	Fuller	Fuller	in-g	Torbn.	Jacx.
Republic, 19	2½	2,595	36x4	36x7	Cont.	4-4½x5½	Eise.	none	Pharo	Strom.	Fuller	Fuller	in-g	Torbn.	Jacx.
Republic, 20	3½	3,795	36x5	36x10	Cont.	4-4½x5½	Eise.	none	Pharo	Strom.	Fuller	Fuller	in-g	Torbn.	Jacx.
Reynolds	1½	2,650	36x3½	36x6	Own	4-4x5½	Eise.	.....	Hink.	Strom.	Own	Own	worm	Own	Own
Reynolds	2½	3,350	36x4	36x8	Own	4-4½x5½	Eise.	.....	Hink.	Strom.	Own	Own	worm	Own	Own
Reynolds	3½	4,350	36x5	36x5	Own	4-4½x5½	Eise.	.....	Hink.	Strom.	Own	Own	worm	Own	Own
Reynolds	5	5,350	36x6	36x6d	Own	4-4½x5½	Eise.	.....	Hink.	Strom.	Own	Own	worm	Own	Own
Riker, B	3	4,600	36x5	36x5d	Own	4-4½x6	Berl.	West.	Own	B. & B.	Own	Own	worm	Own	Ross
Riker, BB	4	4,700	36x5	36x6	Own	4-4½x6	Berl.	West.	Own	B. & B.	Own	Own	worm	Own	Ross
Rowe, CDW	2	3,300	34x4	36x3½	Wis.	4-4x5	Bosch	.....	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Rowe, CDW	2½	3,575	34x4	36x4d	Wis.	4-4x5	Bosch	.....	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Rowe, CW	1½	2,800	36x6*	36x6*	Wis.	4-3½x5	Bosch	.....	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Rowe, GSW	3	3,900	36x5	36x5d	Wis.	4x5	Bosch	.....	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Rowe, GPW	3	4,950	38x7	42x9	H-S	3½x5	A-K	West.	.....	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Rowe, HW	4	4,350	36x5	36x6d	Wis.	4½x6	Bosch	.....	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Rowe, FW	5	5,390	36x6	40x6d	Wis.	4½x6	Bosch	.....	Simplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Ross
Sandow, G	1	2,095	34x3½	34x5	Cont.	4-3½x5	Eise.	.....	.....	.....	Strom.*	Fuller	Fuller	worm	Shel.	Ross
Sandow, CG	1½	2,390	34x3	34x5	Cont.	4-3½x5	Eise.	.....	.....	.....	Strom.*	Fuller	Fuller	worm	Shel.	Ross
Sandow, J	2½	3,175	36x4	36x7	Cont.	4-4½x5½	Bosch	.....	Mon.	Strom.	B-Lipe	B-Lipe	werm	Timkn.	Ross
Sandow, I	2	2,575	36x4	36x6	Cont.	4-3½x5	Eise.	.....	.....	Strom.	Fuller	Fuller	in-g	Torbn.	Ross
Sandow, K	3½	4,195	36x5	36x5d	Cont.	4-4½x5	Bosch	.....	Mon.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Sandow, M	5	4,975	36x6	40x6d	Cont.	4-4½x5½	Bosch	.....	Mon.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Sanford, W-25	2½	3,290	36x4	36x4d	Cont.	4-4½x5½	Bosch	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Sanford, W-35	3½	4,050	36x5	36x5d	Cont.	4-4½x5½	Bosch	none	Pierce	Strom.	B. & B.	B-Lipe	worm	Shel.	Ross
Sanford, W-50	5	4,950	36x5	40x6d	Cont.	4-4½x5½	Bosch	.....	Pierce	Strom.	B. & B.	B-Lipe	worm	Shel.	Ross
Schacht	2	.....	36x4	36x7	Buda	4-4 x5½	Bosch	none	Duplx.	Scheb.	Hart.	Own	worm	Own	Own
Schacht	2½	.....	36x4	36x4d	Buda	4-4½x5½	Bosch	none	Duplx.	Scheb.	Own	Own	worm	Cwn	Own
Schacht	3½	.....	36x5	36x5d	Buda	4-4½x6	Bosch	none	Duplx.	Scheb.	Own	Own	worm	Own	Own
Schacht	5	.....	36x5	40x6d	Buda	4-4½x6	Bosch	none	Duplx.	Scheb.	Own	Own	worm	Own	Own
Schwartz, B	1½	2,175	34x3½	34x5	Cont.	4-3½x5	Bosch	none	Pierce	Strom.	B-Lipe	B-Lipe	in-g	Torbn.	Ross
Schwartz, C	2½	2,675	36x4	36x7	Cont.	4-4½x5½	Bosch	none	Pierce	Strom.	B-Lipe	B-Lipe	in-g	Torbn.	Ross
Schwartz, D	5	4,500	36x6	36x6d	Buda	4-4½x6	Bosch	Bijur	Duplx.	Strom.	B-Lipe	B-Lipe	in-g	Torbn.	Ross
Selden	1½	2,460	34x3½	35x5	Cont.	4-3½x5	Bosch	N. E.	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Lavn
Selden	2½	3,550	36x4	36x7	Cont.	4-4½x5½	Eise.	N. E.	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Selden	3½	4,325	36x5	36x10	Cont.	4-4½x5½	Eise.	N. E.	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Selden	5	5,770	36x6	40x12	Cont.	4-4½x6	Eise.	Conn.	Cont.	Strom.	Det.	B-Lipe	worm	Timkn.	Gem.
Seneca, L	½	.....	30x3½3	0x3½	LeR.	4-3½x4½	Conn.	A-Ch.	.....	Scheb.	B. & B.	Warren	bevel	Peru	Ditw.
Service, LLO	1	2,460	34x3½	34x5	Buda	4-3½x5½	Eise.	West.*	none	Strom.	Fuller	Fuller	worm	Timkn.	Ross
Service, 31	1½	2,985	36x3½	36x6	Buda	4-4x5½	Eise.	West.*	Duplx.	Strom.*	B. & B.	B-Lipe	worm	Timkn.	Ross
Service, 36	1½	3,415	35x5*	38x7*	Buda	4-4½x5½	Eise.	West.*	Duplx.	Strom.	B. & B.	B-Lipe	worm	Timkn.	Ross
Service, 51	2½	3,475	36x4	36x7	Buda	4-4½x5½	Eise.	West.*	Duplx.	Strom.	B. & B.	B-Lipe	worm	Timkn.	Ross
Service, 71	3½	4,285	36x5	36x5d	Buda	4-4½x5½	Eise.	West.*	Duplx.	Strom.	B. & B.	B-Lipe	worm	Timkn.	Ross
Service, 76	3½	4,485	36x5	36x5d	Buda	4-4½x6	Eise.	West.*	Duplx.	Strom.	B. & B.	B-Lipe	worm	Timkn.	Ross

Abbreviations: **Engine**—Wauk., Waukesha; Cont., Continental; H-S, Herschell-Spillman; Lyc., Lycoming; N.A., North American Herc., Hercules; Mil., Milwaukee; Wis., Wisconsin; LeR., LeRoi; GBS, Golden, Belknap & Swartz; Bea., Beaver. **Ignition**—Eise., Eisemann; A-K, Atwater Kent; Koko., Kokomo; Split., Splitdorf; Conn., Connecticut; Lau., Lauraine; Berl., Berling; A-L, Auto-Lite. **Electric Lighting**—Nlite, Nicolite; G&D, Gray & Davis; A-L, Auto-Lite; Dneto., Dyneto; Al-Ch., Allis-Chalmers; West, Westinghouse; L-N, Leece Neville; Det., Detroit; N-E, North East; Wag., Wagner; Asterisk, electric starting also. **Governor**—Wauk., Waukesha; Duplx., Duplex; Cont., Continental; Mon., Monarch; Simplx, Simplex; McCan., McCanna; Rugles, Ruggles. **Carburetor**—Scheb., Schebler; Strom., Stromberg; Ray., Rayfield; King., Kingston; Mon., Monarch; Shake., Shakespeare; Car., Carter; Flech., Fletcher; Holl., Holley; Ens., Ensign; Mast., Master; John., Johnson; Stew., Stewart; Till., Tillotson; Asterisk, vacuum fuel feed. **Clutch**—B.&B., Borg & Beck; B-Lipe Brown-Lipe; Det., Detroit; H-Shaw, Hele-Shaw; Mech., Mechanics; M&E, Merchant & Evans; Lyc., Lycoming; W. G. Co., Warner Gear Co. **Gearset**—B.Lipe, Brown-Lipe; G-Lees, Grant-Lees; Det., Detroit; Mech., Mechanics; Cover., Covert; Savg., Savage Arms; W. G. Co., Warner Gear Co. **Final Drive**—in-g., internal gear; d-rd., double reduction; s-bev., spiral bevel; ext-g., external gear. **Axle**—Timkn., Timken; Torbn., Torbenson; Key-H., Keystone-Hindley; Shel., Sheldon; Salsby., Salisbury, Ind., Industrial; Chcgo., Chicago-Standard; Chgo., Chicago; W-W., Walker-Weiss; Emp., Empire. **Steering Gear**—Gem., Gemmer; Lavn., Lavine; Warn., Warner; Ditw., Ditweiler; Jacx., Jacox; Fost., Foster; Wol., Wohlrab. **Tires**—Asterisk, pneumatic.

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Name of Engine	No. Cyl. Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
Master, BL	5	5,390	36x6	40x6d	Buda	4-4¼x6½	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Master, F	5	5,440	36x6	40x6d	Buda	4-4¼x6½	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	d-rd.	Walker	Ross
Master, FL	5	5,540	36x6	40x6d	Buda	4-4¼x6½	Eise.	opt.	Pierce	Mast.	B-Lipe	B-Lipe	d-rd.	Walker	Ross
Master Trac. T	6	3,050	34x4	36x4d	Buda	4-4½x5½	Eise.	opt.	McCan.	Mast.	B-Lipe	B-Lipe	in-g.	Torbn.	Ross
Maxwell	1½	1,322	32x3	32x4	Own	4-3¼x4½	A-K	A-L	Own	Spec.	Own	Own	worm	Own	Own
Menominee Hurrytown	1	2,080	34x3½	36x5	Wis.	4-3½x5	Eise.	.....	Mon.	Strom.	Fuller	Fuller	worm	Wis.	Ross
Menominee H	1½	2,725	36x3½	36x5	Wis.	4-4x5	Eise.	.....	Mon.	Strom.	Fuller	Fuller	worm	Wis.	Ross
Menominee D	2	3,245	36x4	36x4d	Wis.	4-4x6	Eise.	.....	Mon.	Strom.	Fuller	Fuller	worm	Wis.	Ross
Menominee G	3½	4,270	36x5	36x5d	Cont.	4-4½x5½	Eise.	.....	Mon.	Strom.	B. & B.	Cotta	worm	Timkn.	Ross
Menominee J	5	5,450	36x6	40x6d	Wis.	4-4½x5½	Eise.	.....	Mon.	Strom.	B. & B.	Cotta	worm	Timkn.	Ross
Moreland 19-B	1½	2,930	36x3½	36x5	Cont.	4-4½x5½	Dixie	.....	.....	Miller	Own	Own	worm	Timkn.	Ross
Moreland 19-C	2½	3,775	36x4	36x7	Cont.	4-4½x5½	Dixie	.....	.....	Miller	Own	Own	worm	Timkn.	Ross
Moreland 19-G	4	4,875	36x5	40x5d	Cont.	4-4½x6	Dixie	.....	Cont.	Miller	Own	Own	worm	Timkn.	Ross
Moreland 19-J	5	5,350	36x6	40x6d	Cont.	4-4½x6	Dixie	.....	Cont.	Miller	Own	Own	worm	Timkn.	Ross
Muskegon 20	2	2,325	36x4	36x6	Cont.	4-4½x5½	Eise.	.....	Pierce	Detroit	Fuller	Fuller	in-g.	Torbn.	Lavn.
Mutual	2	3,450	36x4	36x8	Wis.	4-4½x6	Bosch	West.	Duplx.	Strom.	H-Shaw	Fuller	worm	Wis.	Ross
Mutual	3½	.....	36x5	.....	Wis.	4-4½x5½	Bosch	West.	Duplx.	Strom.	H-Shaw	Warner	worm	Wis.	Ross
Mutual	5	.....	36x6	.....	Wis.	4-5.1x5½	Bosch	West.	Duplx.	Strom.	H-Shaw	Warner	worm	Wis.	Ross
Napoleon 9	1	1,535	32x3½	32x4	Gray	4-3½x5	Conn.	A-L	.....	Strom.	Fuller	Fuller	in-g.	Clark	Lavn.
Napoleon 11	1½	1,860	34x4	34x5	Gray	4-3½x5	Conn.	A-L	.....	Strom.	Fuller	Fuller	in-g	Clark	Lavn.
Nash 2018	1	1,785	34x4	34x3	Own	4-3½x5½	Eise.	A-L	Simplx.	Strom.	B. & B.	Detroit	in-g	Clark	Jacx.
Nash 3018	2	2,395	34x4	36x6	Own	4-3½x5½	Eise.	A-L	Simplx.	Strom.	B. & B.	Detroit	in-g	Clark	Jacx.
Nash 4017	2	3,250	34x5	36x5	Buda	4-4½x5½	Eise.	none	Simplx.	Strom.	B. & B.	Own	in-g	Own	Lavn.
Nelson & LeM., F	1	2,250	36x3½	36x4	Cont.	4-4½x5½	Bosch	West.*	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Lavn.
Nelson & LeM., F2	2	.....	36x4	36x7	Cont.	4-4½x5½	Bosch	West.*	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Lavn.
Nels'n &LeM., F3½	3½	.....	36x5	36x5d	Cont.	4-4½x5½	Bosch	West.*	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Lavn.
N'ls'n & LeM., FC5	5	.....	36x6	40x6d	Cont.	4-4½x6	Bosch	West.*	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Lavn.
Netco, D	2	3,100	36x4	36x6	Cont.	4-4½x5½	Eise.	none	.....	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Netco, H	2½	3,500	36x4	36x7	Cont.	4-4½x5½	Eise.	none	none	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Niles	1-2	.....	36x4	36x7	Cont.	4-	Eise.	.....	Pierce	Strom.	B. & B.	Covert	.....	Timkn.	Gem.
Noble, A-20	1	.....	36x3½	36x4	Buda	4-3½x5½	Eise.	Eise.	Pierce	Strom.	Fuller	Fuller	worm	Shel.	Lavn.
Noble, B-30	1½	.....	36x3½	36x5	Buda	4-3½x5½	Eise.	Eise.	Pierce	Strom.	Fuller	Fuller	worm	Shel.	Lavn.
Noble, C-40	2	.....	36x4	36x7	Buda	4-4x5½	Eise.	Eise.	Pierce	Strom.	Fuller	Fuller	worm	Shel.	Lavn.
Noble, D-50	2½	.....	36x4	36x8	Buda	4-4½x5½	Eise.	Eise.	Pierce	Strom.	Fuller	Fuller	worm	Shel.	Lavn.
Noble, E-70	3½	.....	36x5	36x10	Buda	4-4½x6	Eise.	Eise.	Pierce	Strom.	Fuller	Fuller	worm	Shel.	Lavn.
Northway, B-2	2	3,300	36x4	36x4d	Own	4-4x6	Wag.	West.	Pierce	Scheb.	Fuller	Fuller	worm	Shel.	Ross
Northway, B-3½	3½	4,300	36x5	40x5d	Own	4-4x6	Wag.	West	Pierce	Scheb.	Fuller	Fuller	worm	Shel.	Ross
Norwalk, 2000	1	1,695	34x4*	34x4*	Lyc.	4-3½x5	Delco	Dneto.*	none	Zenith	B. & B.	G-Lees	worm	Stand.	C.A.S.
Norwalk, 3000	1½	2,025	34x4	34x5	Lyc.	4-3½x5	Delco	Dneto.*	none	Zenith	B. & B.	G-Lees	worm	Stand.	C.A.S.
O.K.	1½	2,450	36x3½	36x5	Buda	4-4½x5½	Eise.	none	Pierce	Zenith	Fuller	Fuller	worm	Wis.	Ross
O.K.	2½	3,250	36x4	36x7	Buda	4-4½x5½	Eise.	none	Pierce	Zenith	Fuller	Fuller	worm	Wis.	Ross
O.K.	3½	4,150	36x5	36x5d	Buda	4-4½x6	Eise.	none	Pierce	Zenith	Fuller	Fuller	worm	Wis.	Ross
Old Hickory, W	1	2,175	36x3½	36x4	Cont.	4-3½x5	Eise.	.....	Pierce	Strom.	B. & B.	G-Lees	worm	Timkn.	Lavn.
Oldsmobile	¾	1,250	35x5*	35x5*	Own	4-3¼x5½	A-L	A-L	.....	Zenith	Own	Warner	ineg.	Torbn.	Jacx.
Old Reliable, A	1½	2,350	34x3½	36x6	Wis.	4-4x5	Bosch	opt.	Mon.	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Old Reliable, B	2½	3,500	36x4	36x4d	Wis.	4-4½x6	Bosch	opt.	Mon.	Strom.	Fuller	Fuller	worm	Shel.	Ross
Old Reliable, C	3½	4,250	36x5	36x5d	Wis.	4-4½x6	Bosch	opt.	Mon.	Strom.	Fuller	Fuller	worm	Shel.	Ross
Old Reliable, D	5	5,250	36x6	40x6d	Wis.	4-5.1x5½	Bosch	opt.	Duplx.	Strom.	Univ.	Savg.	worm	Shel.	Ross
Old Reliable, K, L & M	7½	6,250	36x6	40x7d	Wauk.	4-4½x6½	Bosch	none	Wauk.	Strom.	Univ.	Savg.	chain	Shel.	Ross
Oneida, A-9	1½	2,350	36x6*	36x6*	Own	4-3½x5½	Bosch	West.	Own	Strom.	Own	Own	worm	Own	Ross
Oneida, B-9	1½	2,750	36x3½	36x6	Own	4-4x5½	Bosch	West.	Own	Strom.	Own	Own	worm	Own	Ross
Oneida, C-9	2½	3,200	36x4	36x7	Own	4-4x5½	Bosch	West.	Own	Strom.	Own	Own	worm	Own	Ross
Oneida, D-9	3½	4,100	36x5	36x10	Own	4-4½x5½	Bosch	West.	Own	Strom.	Own	Own	worm	Timkn.	Ross
Oneida, E-9	5	5,150	36x6	40x12	Own	4-4½x5½	Bosch	West.	Own	Strom.	Own	Own	worm	Timkn.	Ross
Oshkosh	2	3,750	36x6*	36x6*	H-S	4-3½x5	N.E.	N. E.	Duplx.	Zenith	B-Lipe	B-Lipe	bevel	Own	Ross
Packard, E, Size B		3,200	34x3½	34x3½d	Own	4-4 1/8x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size C		3,850	34x4	34x4d	Own	4-4 1/8x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size D		4,900	36x5	36x5d	Own	4-4½x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size E		4,550	36x5	40x5d	Own	4-4½x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size F		5,950	36x6	40x6d	Own	4-5x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size G		5,700	36x6	40x7d	Own	4-5x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size V		4,100	36x6	38x7	.....	-4 1/8x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size X		4,650	36x6	40x8	.....	-4 1/8x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Packard, E, Size Y		6,050	38x7	44x10	.....	-5x5½	Dixie	Bijur*	Own	Own	Own	Own	worm	Own	Own
Paige, 52-19	1½	2,680	34x5	38x7	Hink.	4-4x5½	Bosch	.....	Hink.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	.....
Paige, 50-18	2½	3,150	34x4	34x4d	Cont.	4-4½x5½	Bosch	none	Simplx.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Jacx.
Service, 101	5	5,275	36x6	40x6d	Buda	4-4½x6	Eise.	West.*	Duplx.	Strom.	B. & B.	B-Lipe	worm	Timkn.	Ross
Shaw, M-2	¾	1,975	32x4	32x4	Cont.	4-3½x5	Bosch	.....	.....	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Shaw, M-4	1	2,300	34x3	34x4	Cont.	4-3½x5	Bosch	.....	.....	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Signal, F	1	2,750	34x3½	36x5	Cont.	4-4½x5½	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Signal, H	1½	2,925	34x4	36x6	Cont.	4-4½x5½	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Signal, J	2½	3,275	34x4	36x8	Cont.	4-4½x5½	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Signal, M	3½	4,275	36x5	40x10	Cont.	4-4½x5½	Eise.	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Signal, R	5	5,300	36x6	40x12	Cont.	4-4½x6	Eise.	none	.....	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Southern, A	1	1,495	34x4	34x4	Buda	4-3½x5½	Delco	.....	Pierce	Zenith	B. & B.	.....	.....	.....	.....
Southern, B	1½	1,795	34x4	34x4	Cont.	4-3½x5	Delco	.....	Pierce	Zenith	B. & B.	.....	.....	.....	.....
Standard, 56	1	.....	34x3½	34x4	Cont.	4-3½x5	Eise.	none	Mon.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Standard, 76	2½	.....	36x4	36x7	Cont.	4-4½x5½	Eise.	none	Mon.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Standard, 66	3½	.....	36x5	36x5	Cont.	4-4½x5½	Eise.	none	Mon.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Standard, 86	5	.....	36x6d	40x6d	Cont.	4-4½x5½	Eise.	none	Mon.	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Gem.
Sterling	1½	2,850	36x3½	36x5	Own	4-4x5½	Eise.	.....	Wauk.	Ray.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Sterling	2	3,100	36x4	36x6	Own	4x5½	Eise.	.....	Wauk.	Ray.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Sterling	2½	3,475	36x4	36x4d	Own	4-4½x5½	Eise.	West.	Wauk.	Ray.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Sterling	3½	4,550	36x5	40x5d	Own	4-4½x6½	Eise.	West.	Wauk.	Ray.	M.&E.	Own	worm	Timkn.	Ross
Sterling, W	5	5,350	36x6	40x6d	Own	4-5x6½	Eise.	West.	Wauk.	Ray.	M.&E.	Own	worm	Timkn.	Ross
Sterling, C	5	5,600	36x6	40x5d	Own	4-5x6½	Eise.	West.	Wauk.	Ray.	M.&E.	Own	chain	Own	Ross
Sterling	7½	6,000	36x6	40x7d	Own	4-5x6½	Eise.	West.	Wauk.	Ray.	M.&E.	Own	chain	Own	Ross
Stewart	¾	1,295	32x4*	32x4*	LeR.	4-3½x4½	Bise.	.....	none	Zenith	B. & B.	Durston	in-g	Clark	C.A.S.
Stewart, 8	1	1,650	34x3½	34x4	Cont.	4-3½x5	Eise.	.....	Spec.	Zenith	B. & B.	Durston	in-g	Clark	Gem.
Stewart, 9	1½	1,995	34x3½	34x5	Cont.	4-3½x5	Eise.	.....	Spec.	Zenith	Fuller	Fuller	in-g	Clark	Gem.
Stewart, 7	2	2,495	34x4	34x4d	Cont.	4-4½x5½	Eise.	.....	Pierce	Zenith	Fuller	Fuller	in-g	Clark	Ross
Stewart, 10	3½	3,395	36x5	36x5d	Cont.	4-4½x5½	Eise.	.....	Pierce	Zenith	Fuller	Fuller	in-g	Clark	Ross
Stoughton, B	1½	2,350	36x3½	36x5	Wauk.	4-3½x5½	Eise.	.....	.....	Strom.	B-Lipe	B-Lipe	worm	Shel.	.....
Stoughton, D	2	2,890	36x4	36x7	Wauk.	4-4x5½	Eise.	.....	.....	Strom.	B-Lipe	B-Lipe	worm	Shel.	.....
Stoughton, E	3	3,600	36x4	36x5d	Wauk.	4-4½x5½	Eise.	.....	.....	Strom.	B-Lipe	B-Lipe	worm	Shel.	.....
Sullivan, F	1½	2,350	36x4	36x5	Buda	4-3½x4½	Bosch	.....	none	Strom.	.....	Covert	worm	Timkn.	Ross
Sullivan, E	2	2,975	36x4	36x7	Buda	4-4½x5½	Bosch	.....	none	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Sullivan, H	3½	.....	36x5	36x5d	Buda	4-4½x6	Bosch	.....	none	Strom.	B-Lipe	B-Lipe	worm	Timkn.	Ross
Super Truck 50	2½	3,200	36x4	36x8	Wis.	4-4x6	.....	Vesta	Simplx.	Zenith	Fuller	.....	worm	Shel.	Lavn.
Super Truck 70	3½	4,100	36x5	40x5d	Wis.	4-4½x6	.....	Vesta	Simplx.	Zenith	Fuller	.....	worm	Shel.	Ross
Super Truck 100	5	4,800	36x5	40x6d	Wis.	4-4½x6	.....	Vesta	Simplx.	Zenith	Hill	.....	worm	Shel.	Ross
Superior D	1	1,675	34x4½	34x4	Cont.	4-3½x5	Eise.	Opt.	Pierce	Strom.	Fuller	Fuller	in-g	Torbn.	C.A.S.
Superior E	2	2,600	34x4	36x6	Cont.	4-4½x5½	Eise.	Opt.	Pierce	Strom.	Fuller	Fuller	in-g	Torbn.	Ross
Texan	1½	1,525	34x4*	34x5	Lyc.	4-3½x5	Conn.	Bijur	.....	Car.	B. & B.	B-Lipe	worm	Chcgo.	C.A.S.
Tiffin A	¾	1,100	35x4½	35x4½*	Cont.	4-3½x5	Bosch	none	none	Scheb.	Det.	Det.	in-g	Russel	Lavn.
Tiffin GW	1½	2,530	36x3½	36x5	Cont.	4-3½x5½	Bosch	none	Pierce	Scheb.	Fuller	Fuller	worm	Shel.	Ross
Tiffin MW	2½	3,350	36x4	36x3½d	Cont.	4-4½x5½	Bosch	none	Pierce	Scheb.	Hart.	Fuller	worm	Shel.	Ross
Tiffin PW	3½	4,375	36x5	36x5d	Cont.	4-4½x5½	Bosch	West.*	Pierce	Scheb.	B. & B.	Fuller	worm	Shel.	Ross
Tiffin RW	5	5,250	36x6	40x6d	Cont.	4-4½x6	Bosch	West.	none	Scheb.	B. & B.	Covert	worm	Shel.	Ross
Tiffin SW	9	5,450	36x6	40x12	Cont.	4-4½x6	Bosch	West.*	none	Scheb.	B. & B.	Covert	worm	Shel.	Ross
Titan 2½	2½	3,400	34x4	36x4d	Buda	4-4½x5½	Eise.	none	Simplx.	Strom.	B. & B.	Cotta	in-g	Clark	Wol.
Titan, T	3½	4,400	36x5	40x5d	Buda	4-4½x6	Eise.	West.	Simplx.	Strom.	B. & B.	Cotta	in-g	Clark	Lavn.
Titan, H	6	5,400	36x6	40x6d	Buda	4-4½x6	Eise.	West.	Simplx.	Strom.	B. & B.	Cotta	in-g	Clark	Lavn.
Tower, J	1½	2,820	35x5	38x7	Cont.	4-4½x5½	Bosch	.....	.....	Zenith	.....	.....	worm	.....	Ross
Tower, H	2½	3,385	36x4	36x7	Cont.	4-4½x5½	Bosch	.....	.....	Zenith	Fuller	Fuller	worm	.....	Ross
Tower, G	3½	4,335	36x5	36x5	Cont.	4-4½x5½	Bosch	.....	.....	Zenith	Fuller	Fuller	worm	.....	Ross
Traffic	2	1,495	34x3½	34x5	Cont.	4-3½x5	Bosch	none	none	Carter	Covert	Covert	in-g	Russel	Own
Transport, 20	1	1,850	34x3	34x4	Cont.	4-3½x5	Eise.	none	Duplx.	Strom.	Fuller	Fuller	in-g.	Clark	Jack.
Transport, 30	1½	2,250	36x3½	36x5	Cont.	4-3½x5	Eise.	none	Duplx.	Strom.	Fuller	Fuller	in-g.	Clark	Jacx.
Transport, 50	2	2,750	36x4	36x7	Cont.	4-4½x5½	Eise.	.....	Duplx.	Strom.	Fuller	Fuller	in-g.	Clark	Jacx.
Traylor, B	1	1,950	34x3½	34x5	Buda	4-3½x5½	Split.	Spec.	Pierce	Zenith	Covert	Covert	.....	Shel.	Ross
Traylor, C	1½	2,750	36x4	36x6	Buda	4-4x5½	Split.	Spec.	Pierce	Zenith	Covert	Covert	.....	Shel.	Ross
Traylor, D	2½	3,250	36x4	36x7	Buda	4-4½x5½	Split.	Spec.	Pierce	Zenith	Covert	Covert	.....	Shel.	Ross
Triangle, AA	¾	1,550	35x5	35x5	H-S	4-3½x5	N. E.	N. E.	none	Strom.	Fuller	Fuller	in-g.	Clark	Gem.
Triangle, A	1½	2,185	34x3½	34x6	Wauk.	4-3½x5½	Eise.	none	Wauk.	Strom.	Fuller	Fuller	in-g.	Clark	Gem
Triangle, C	2	2,585	36x4	36x6	Wauk.	4-3½x5½	Eise.	.....	Wauk.	Strom.	Fuller	Fuller	in-g.	Clark	Gem
Triangle, B	2½	2,850	36x7	36x7	Ruten.	4-4½x5½	Eise.	.....	Pierce	Strom.	Fuller	Fuller	in-g.	Clark	Gem
Triumph	1½	2,550	36x3½	36x5	Buda	4-3½x5½	Dixie	none	King	B. & B.	Cotta	in-g	Russel	Lavn.	
Triumph	2	2,850	36x4	36x7	Buda	4-3½x5½	Dixie	none	King	B. & B.	Cotta	in-g	Russel	Lavn.	
Triumph	2	2,950	36x4	36x7	Buda	4-3½x5½	Dixie	none	King	B. & B.	Cotta	worm	Russel	Lavn.	
Twin City	2	.....	36x4	36x7	Buda	4-4x5½	Bosch	.....	Simplx.	Strom.	Fuller	Fuller	in-g.	Clark	Ross
Twin City	3½	.....	36x5	40x5d	Own	4-4½x6	Bosch	.....	Own	Opt.	B. & B.	Fuller	worm	Timkn.	Ross
Ultimate	1½	.....	.....	.....	Buda	4-4½x5½	Eise.	.....	.....	Strom.	B-Lipe	B-Lipe	.....	Shel.	Ross
Union, F	2½	3,150	36x5	36x8	Wis.	4-4x6	Eise.	opt.	Duplx.	Scheb.	Fuller	Fuller	in-g.	Russel	Ross
Union, H	4	3,975	36x6	36x10	Wis.	4-4½x6	Eise.	opt.	Duplx.	Scheb.	Fuller	Fuller	in-g.	Russel	Ross
United, A	1½	2,100	36x3½	36x6	Buda	4-3½x5½	Eise.	opt.	Simplx*	Strom.	B-Lipe	B-Lipe	in-g.	Clark	Ross

Abbreviations: **Engine**—Wauk., Waukesha; Cont., Continental; H-S, Herschell-Spillman; Lyc., Lycoming; N.A., North American; Herc., Hercules; Mil., Milwaukee; Wis., Wisconsin; LeR., LeRoi; GBS, Golden, Belknap & Swarts; Bea., Beaver. **Ignition**—Eise., Eisemann; A-K, Atwater Kent; Koko., Kokomo; Split., Splitdorf; Conn., Connecticut; Lau., Lauraine; Berl., Berling; A-L, Auto-Lite. **Electric Lighting**—Nlite, Nicolite; G&D, Gray & Davis; A-L, Auto-Lite; Dneto., Dyneto; Al-Ch., Allis-Chalmers; West, Westinghouse; L-N, Leece Neville; Det., Detroit; N-E, North East; Wag., Wagner; Asterisk, electric starting also. **Governor**—Wauk., Waukesha; Duplx., Duplex; Cont., Continental; Mon., Monarch; Simplx, Simplex; McCan., McCanna; Rugles, Ruggles. **Carburetor**—Scheb., Schebler; Strom., Stromberg; Ray., Rayfield; King., Kingston; Mon., Monarch; Shake., Shakespeare; Car., Carter; Flech., Fletcher; Holl., Holley; Ens., Ensign; Mast., Master; John., Johnson; Stew., Stewart; Till., Tillotson; Asterisk, vacuum fuel feed. **Clutch**—B.&B., Borg & Beck; B-Lipe Brown-Lipe; Det., Detroit; H-Shaw, Hele-Shaw; Mech., Mechanics; M&E, Merchant & Evans; Lyc., Lycoming; W. G. Co., Warner Gear Co. **Gearset**—B.Lipe, Brown-Lipe; G-Lees, Grant-Lees; Det., Detroit; Mech., Mechanics; Cover., Covert; Savg., Savage Arms; W. G. Co., Warner Gear Co. **Final Drive**—in-g., internal gear; d-rd., double reduction; s-bev., spiral bevel; ext-g., external gear. **Axle**—Timkn., Timken; Torbn., Torbenson; Key-H., Keystone-Hindley; Shel., Sheldon; Salsby., Salisbury, Ind., Industrial; Chcgo., Chicago-Standard; Chgo., Chicago; W-W., Walker-Weiss; Emp., Empire. **Steering Gear**—Gem., Gemmer; Lavn., Lavine; Warn., Warner; Ditw., Ditweiler; Jacx., Jacox; Post., Foster; Wol., Wohlrab. **Tires**—Asterisk, pneumatic.

Motor Age Monthly Guide to Truck Specifications—Concluded

These tables are revised and brought up to date monthly

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Name of Engine	No. Cyl. Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
United, B	2½	2,850	36x4	36x7	Buda	4—4½x5½	Eise.	.....	Simplx*	Strom.	B-Lipe	B-Lipe	in-g.	Clark	Ross
United, C	3½	3,750	36x5	36x5d	Buda	4—4½x5½	Eise.	.....	Simplx*	Strom.	B-Lipe	B-Lipe	in-g.	Clark	Ross
United, V	5	4,950	36x5	40x6d	Buda	4—4½x6	Eise.	.....	Simplx*	Strom.	B-Lipe	B-Lipe	in-g.	Clark	Ross
U. S., N	1½	2,250	36x3½	36x5	Cont.	4—3½x5	Eise.	opt.	none	Strom.	B-Lipe	B-Lipe	in-g.	Shel.	Ross
U. S., N. W	1½	2,650	36x3½	36x5	Cont.	4—3½x5	Eise.	opt.	none	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
U. S., R	2½	3,850	36x4	36x4d	Own	4—4x5½	Eise.	opt.	Own	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
U. S., S	3½	4,450	36x5	36x5d	Own	4—4½x5½	Eise.	opt.	Own	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
U. S., T	5	5,600	36x6	40x9d	Own	4—4½x6½	Eise.	opt.	Simplx	Strom.	B-Lipe	B-Lipe	worm	Shel.	Ross
Victor	1½	2,050	34x4	34x5	Cont.	4—3½x5	Eise.	opt.	none	Strom.	Fuller	Fuller	Opt.	.....	Ross
Velie, 46	1½	1,925	36x3½	36x5	Cont.	4—3½x5	Eise.	opt.	Mon.	Strom.	B. & B	Durst.	in-g.	Torbn.	Ross
Vim, 27	3	1,095	31x4	31x4	Own	4—3x4	Eise.	West.	none	Zenith	Own	Own	worm	Shel.	C.A.S.
Vim, 28	3	1,350	32x4½	32x4½	Own	4—3x4½	A-K	West.	none	Zenith	Own	Own	worm	Shel.	C.A.S.
Vim, 25	1	2,195	35x5	35x5	Herc.	4—3½x5	Split.	none	none	Zenith	B-Lipe	B-Lipe	worm	Shel.	Gem.
Vim, 22	2	3,150	36x6	36x6	Herc.	4—3½x5½	Split.	none	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Gem.
Vim, 23	3	3,050	36x5	36x5d	Herc.	4—4½x5½	Split.	none	Duplx.	Zenith	B-Lipe	B-Lipe	worm	Shel.	Gem.
Walker Johnson,B	2½	2,890	36x4	36x8	Buda	4—4½x5½	Eise.	none	Pierce	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Walter, MO	3	.....	40x4d	40x4d	Own	4—4½x6	.....	none	Own	Zenith	Own	Own	ext-g.	Own	Own
Walter, S	5	5,500	40x6d	40x6d	Wauk.	4—4½x6½	Simms	West.	Own	Strom.	B-Lipe	Warn.	in-g.	Own	Ross
Ward La France, 2-B	2½	3,590	36x4	36x7	.....	4—4½x5½	Bosch	West.	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Ward La France, 4-A	3½	4,490	36x5	36x5d	.....	4—4½x6½	Bosch	West.	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Ward La France, 5-A	5	5,490	36x6	40x6d	.....	4—5x6½	Bosch	West.	Own	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Watson	1	1,750	34x4½	34x4½	Wauk.	4—3½x5½	Conn.	Dyn.	Wauk.	John.	B-Lipe	B-Lipe	worm	Own	Lavn.
Watson	3½	.....	36x5	36x10	Cont.	4—4½x5½	Simms	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Wis.	Gem.
White, 15	½	2,400	34x4½*	34x4½*	Own	4—3½x5½	.....	.....	none	Own	Own	Own	bevel	Own	Own
White, 20	2	3,300	36x4	36x7	Own	4—3½x5½	.....	.....	none	Own	Own	Own	d-rd	Own	Own
White, 40	3	4,500	36x5	40x5d	Own	4—3½x5½	.....	.....	Own	Own*	Own	Own	d-rd	Own	Own
White, 45	5	5,000	36x6	40x6d	Own	4—4½x5½	.....	.....	Own	Own*	Own	Own	d-rd	Own	Own

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Name of Engine	No. Cyl. Bore and Stroke	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
White Hickory, E	1	2,350	35x5	35x5	Cont.	4—3½x5	Eise.	none	Simplx.	Strom.	Fuller	Fuller	worm	Timkn.	Ross
White Hickory, H	1½	2,475	36x3½	36x5	Cont.	4—3½x5	Eise.	none	Simplx.	Strom.	Fuller	Fuller	worm	Timkn.	Ross
White Hickory, K	2½	3,075	36x4	36x7	Cont.	4—4½x5½	Eise.	none	Simplx.	Strom.	Own	Fuller	worm	Timkn.	Lavn.
Wichita, K	1	2,300	36x3	36x4	Own	4—3½x5	.....	.....	None	Strom.	Own	Cotta.	worm	Shel.	Ross
Wichita, L	1½	2,600	36x3½	36x5	Own	4—3½x5	.....	.....	Wauk.	Strom.	Own	Cotta.	worm	Shel.	Ross
Wichita, M	2	2,800	36x3½	36x6	Own	4—3½x5½	.....	.....	Wauk.	Strom.	Own	Cotta.	worm	Shel.	Ross
Wichita, R	2½	3,000	36x4	36x7	Wauk.	4—3½x5½	.....	.....	Duplx.	Strom.	Own	Cotta.	worm	Shel.	Ross
Wichita, RX	2½	3,600	36x4	36x8	Beav.	4—4x6	.....	.....	Duplx.	Strom.	Hart.	Cotta.	worm	Shel.	Ross
Wichita, O	3½	4,000	36x5	36x5d	Beav.	4—4x6	.....	.....	Duplx.	Strom.	Hart.	Cotta.	worm	Shel.	Ross
Wichita, S	5	5,000	36x6	40x6d	Beav.	4—4x6	.....	.....	Duplx.	Strom.	Hart.	Own	d-rd	Shel.	Ross
Wilcox, A-1	1	.....	35x5	35x6	Buda	4—3½x5½	Bosch	none	Pierce	Strom.	B-Lipe	B-Lipe	worm	Wis.	Gem.
Wilcox, B	1½	.....	36x4	36x5	Own	4—4x5	Bosch	none	Pierce	Wil-B	Own	Own	worm	Wis.	Own
Wilcox, C	2½	.....	36x4	36x3d	Own	4—4x6	Bosch	none	Pierce	Wil-B	Own	Own	worm	Wis.	Own
Wilcox, E	3½	.....	36x5	36x5d	Buda	4—4x5	Bosch	none	Pierce	Wil-B	Own	Own	worm	Shel.	Own
Wilcox, W	6	.....	36x5	40x6d	Wauk.	4—4x6½	Bosch	none	Wauk.	Wil-B	Own	Own	worm	Shel.	Own
Wilson, F	1½	2,650	36x3½	36x5	Cont.	4—3½x5½	Eise.	opt.	Pierce	Marvel	B. & B.	B-Lipe	worm	Timkn.	Ross
Wilson, EA	2½	3,300	36x4	36x7	Cont.	4—4x5½	Eise.	opt.	Pierce	Marvel	Marvel	Warner	worm	Timkn.	Ross
Wilson, G	3½	4,300	36x5	36x5d	Cont.	4—4½x5½	Eise.	opt.	Pierce	Marvel	Warner	Warner	worm	Timkn.	Ross
Wilson, H	5	5,275	36x6	40x6d	Cont.	4—4½x5½	Eise.	opt.	Pierce	Marvel	Warner	Warner	worm	Timkn.	Ross
White, 751	1½	1,795	31x4½	35x5	H-S	4—3x5	.....	West.	.....	Strom.	Warner	Warner	in-g.	Torbn	Lavn.
Winther, 39	1½	2,450	34x3½	34x5	Wis.	4—3½x5	Eise.	West.	.....	Strom.	Fuller	Fuller	in-g.	Clark	Lavn.
Winther, 430	1½	2,850	32x4	32x4	Wis.	4—3½x5	Eise.	West.	.....	Strom.	Fuller	Fuller	in-g.	Clark	Lavn.
Winther, 49	2	3,250	34x4	34x4d	Wis.	4—4 x5	Eise.	West.	.....	Mast.*	B-Lipe	B-Lipe	in-g.	Clark	Ross
Winther, 70	3	4,100	36x5	36x5d	Wis.	4—4x6	Eise.	West.	.....	Mast.*	B. & B.	B-Lipe	in-g.	Clark	Ross
Winther, 109	5	5,250	36x6	40x6d	Wis.	4—4½x6	Eise.	West.	Simplx	Mast.*	B. & B.	B-Lipe	in-g.	Clark	Ross
Winther, 140	7	5,900	36x6	40x7d	Wis.	4—4x6	Eise.	West.	Simplx	Mast.*	B. & B.	B-Lipe	in-g.	Clark	Ross
Winther, 450	2½	2,690	34x5	36x6	Wis.	4—4x5	Eise.	West.	.....	Strom.	Fuller	Fuller	in-g.	Clark	Lavn.
Witt-Will, N	1	2,100	36x3*	36x4*	Cont.	4—3½x5½	Eise.	.....	Pierce	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Witt-Will, P	2½	3,250	36x3*	36x7	Cont.	4—4½x5½	Eise.	.....	Pierce	Zenith	B-Lipe	B-Lipe	worm	Timkn.	Ross
Wolverine, C	1½	2,380	34x3½	34x5	Cont.	4—3½x5	Eise.	G&D*	Mon.	Strom.	Fuller	Fuller	in-g.	Russel	Gem
Wolverine, D	2	2,650	34x4	34x3d	Cont.	4—3½x5	Eise.	G&D	Mon.	Strom.	Fuller	Fuller	in-g.	Russel	Gem

Abbreviations: **Engine**—Wauk., Waukesha; Cont., Continental; H-S, Herschell-Spillman; Lyc., Lycoming; N.A., North American; Herc., Hercules; Mil., Milwaukee; Wis., Wisconsin; LeF., LeRoi; GBS, Golden, Belknap & Swartz; Bea., Beaver. **Ignition**—Eise., Eisemann; A-K, Atwater Kent; Koko., Kokomo; Split., Splitdorf; Conn., Connecticut; Lau., Lauraine; Berl., Berling; A-L, Auto-Lite. **Electric Lighting**—Nite, Nicolite; G&D, Gray & Davis; A-L, Auto-Lite; Dneto., Dyneto; Al-Ch., Allis-Chalmers; West, Westinghouse; L-N, Leece Neville; Det., Detroit; N-E, North East; Wag., Wagner; Asterisk, electric starting also. **Governor**—Wauk., Waukesha; Duplx., Duplex; Cont., Continental; Mon., Monarch; Simplx, Simplex; McCan., McCanna; Rugles, Ruggles. **Carburetor**—Schebl., Schebler; Strom. Stromberg; Ray., Rayfield; King., Kingston; Mon., Monarch; Shake., Shakespeare; Car., Carter; Fleet., Fletcher; Holl., Holley; Ens., Ensign; Mast., Master; John., Johnson; Stew., Stewart; Till., Tillotson; Asterisk, vacuum fuel feed. **Clutch**—B.&B., Borg & Beck; B-Lipe, Brown-Lipe; Det., Detroit; H-Shaw, Hele-Shaw; Mech., Mechanics; M&E, Merchant & Evans; Lyc., Lycoming; W. G. Co., Warner Gear Co. **Gearset**—B.Lipe, Brown-Lipe; G-Lees, Grant-Lees; Det., Detroit; Mech., Mechanics; Cover., Covert; Save., Savage Arms; W. G. Co., Warner Gear Co. **Final Drive**—in-g., internal gear; d-rd, double reduction; s-bev., spiral bevel; ext-g., external gear. **Axle**—Timkn, Timken; Torbn., Torbenson; Key-H., Keystone-Hindley; Shel., Sheldon; Salsby., Salsbury; Ind., Industrial; Chgo., Chicago Standard; Chgo., Chicago; W.-W., Walker-Weise; Emp., Empire. **Steering Gear**—Gem., Gemmer; Lavn., Lavine; Warn., Warner; Dftw., Ditweiler; Jacx., Jacox; Fost., Foster; Wol., Wohlrab. **Tires**—Asterisk, pneumatic.

RENEWING PARTS BY ELECTRO-DEPOSITION

(*Concluded from page 17.*)

the work. The anode was then suspended from the rocker arm and made to surround the work concentrically, as, especially with thick deposits, it appears to be important to keep the anode as nearly as possible equidistant from the work at all points.

If this is not done, the deposit on the side nearest to the anode tends to become thicker than the other.

Construction of the Anodes

These were made of Swedish iron wire about 16 S.W.G., thoroughly annealed, and wound into the form of a woven cylinder.

They were suspended and stiffened by means of a ¼-in. iron rod on one side which was attached at the top to the rocker arm.

The anodes were fitted in addition with two celluloid cones to produce an upward pumping action. The effect of this action is important, as it is essential to avoid having stagnant solution in contact with the work, and it is also desirable to keep the ferrous carbonate in the solution in a state of suspension.

The foregoing represents the process, and although it has not been set out in detail, it is necessary to point out that the determining factor of it all is the personal equation. An inefficient operator will make little or nothing of it, though in skilled and sympathetic hands the process can yield very valuable results.

AVERY HOLDS SECOND MEETING

Peoria, Ill., Oct. 8—The second of three sales conferences of the Avery branch managers and assistants held here was attended by approximately sixty field men, department heads and officers from the branches at Des Moines, Waterloo, Iowa; Davenport, Iowa; Madison, Wis.; Indianapolis, Columbus and Peoria, Ill.

BROCKTON HOLDS SHOW

Brockton, Oct. 9—A special automobile show building and four tents to take care of the overflow exhibits were centers of interest at the fair here this week. The exhibition served as a Fall show and a great deal of business was done. It was the best automobile show in the history of the fair. Many concerns were showing their 1921 models. There was also a good showing of trucks and accessories.

MACK SALESMEN MEET

Boston, Oct. 9—At the City Club a harvest time get-together meeting of the New England organizations of the Mack Motor Truck Co, was held with a number of factory officials present, including President R. E. Fulton, A. F. Masury, chief engineer; D. C. Femer of the public works department; A. C. Fetzer, of the General Sales department, and M. C. Horine of the engineering division. There were 75 Mack salesmen, branch managers and Mack agents in attendance.

Firing Order of 1920 Engines

Motor Age Maintenance Data Sheet No. 118

One of a series of weekly pages of information valuable to service men and dealers—save this page

Name and Model	Engine Make	No. of Cyls.	FIRING ORDER							
			Cyl. No. 1	Cyl. No. 2	Cyl. No. 3	Cyl. No. 4	Cyl. No. 5	Cyl. No. 6	Cyl. No. 7	Cyl. No. 8
Allen, 43	Own	4	1	2	4	3				
American, 6-60	H-S	6	1	4	2	6	3	5		
American Beauty	H-S	6	1	4	2	6	3	5		
Anderson, S-30	Cont.	6	1	5	3	6	2	4		
Apperson, All	Own	8	1	6	3	5	4	7	2	8
Auburn, 6-39	Cont., 7 R	6	1	5	3	6	2	4		
Beggs	Cont.	6	1	5	3	6	2	4		
Bell										
Biddle										
Bour-Davis, 21 S. F. & R	Cont., 9 N	6	1	5	3	6	2	4		
Briscoe, 4-34	Own	4	1	3	4	2				
Buick, 1921	Own	6	1	4	2	6	3	5		
Caddillac, 59	Own	8	1L	2R	3L	1R	4L	3R	2L	4R
Case, V	Cont., 9 N	6	1	5	3	6	2	4		
Chalmers, 35-C	Own	6	1	4	2	6	3	5		
Chandler, 27	Own	6	1	5	3	6	2	4		
Chevrolet, F. B	Own	4	1	2	4	3				
Cleveland, 40	Own	6	1	5	3	6	2	4		
Climber, S-1920										
Cole, 870	North, 309	8	1L	2R	3L	1R	4L	3R	2L	4R
Columbia	Cont., 7 R	6	1	5	3	6	2	4		
Comet	Cont., 9 N	6	1	5	3	6	2	4		
Commonwealth, 45	H-S	4	1	4	3	2				
Crawford										
Crow-Elkhart	Overhead Valve	4	1	4	3	2				
Crow-Elkhart, L-55	Lyc.	4	1	3	4	2				
Crow-Elkhart, H-55	Ruten.	6	1	5	3	6	2	4		
Cunningham, V 4	Own	8	1L	4R	3L	2R	4L	1R	2L	3R
Daniels, D	Own	8								
Davis	Cont., 7 R	6	1	5	3	6	2	4		
Dodge	Own	4	1	3	4	2				
Dort, 15	Lyc.	4	1	3	4	2				
Dixie Flyer, H	H-S	4	1	3	4	2				
Dorris, 6-80	Own	6	1	5	3	6	2	4		
Du Pont, A	Own	4	1	3	4	2				
Elcar, 21	Cont.	6	1	5	3	6	2	4		
Elgin, K	Falls	6	1	4	2	6	3	5		
Essex, A	Own	4	1	3	4	2				
Ferris, C-20	Cont., 9-N	6	1	5	3	6	2	4		
Ford, T	Own	4	1	2	4	3				
Franklin, S 9-B	Own	6	1	4	2	6	3	5		
Gardner, G	Lyc., K	4	1	3	4	2				
Geronimo, 6-A45	Ruten.	6	1	5	3	6	2	4		
Grant	Own	6	1	4	2	6	3	5		
Hanson, 54-60	Cont. 7R	6	1	5	3	6	2	4		
Harroun	Own	4	1	3	4	2				
Haynes, 47	Own	6	1	4	2	6	3	5		
Haynes, 48	Own	12	1R	6L	4R	3L	2R	5L		
			6R	1L	3R	4L	5R	2L		
H. C. S.	Weid.	4	1	3	4	2				
Hollier	Cont.	6	1	5	3	6	2	4		
Holmes, S-3	Own	6	1	4	2	6	3	5		
Hudson, O	Own	6	1	5	3	6	2	4		

(Continued next week)

Abbreviations—Cont., Continental; Duesen., Duesenberg; H-S, Herschell-Spillman; Lyc., Lycoming; North., Northway; Ruten., Rutenber; Weid., Weidely; L, left; R, Right.

From the Four Winds

Glimpses at the World of Motordom

COMING MOTOR EVENTS

Automobile Shows

Dallas, Texas	Automobile Show	Oct. 9-14
Edwardsville, Ill	Automobile Show	Oct. 15-17
Pittsburgh, Pa	Automobile Show	Oct. 16
Atlanta, Ga	Automobile Show	Oct. 16-26
New York	Automobile Salon	Nov. 14-21
Chicago	Automotive Equipment Show	Nov. 15-20
Jersey City, N. J	Annual Automobile Show	Nov. 15-20
Jacksonville, Fla	Annual Automobile Show	Nov. 18-27
Houston, Texas	Automobile Show	Nov. 20-28
New York	National Passenger Car Show	Jan. 8-15, 1921
Milwaukee	Annual Winter Show	Jan. 14-21, 1921
Schnectady, N. Y	Annual Automobile Show	Jan. 16-22, 1921
Amsterdam, N. Y	Annual Automobile Show	Jan. 23-29, 1921
Chicago	National Passenger Car Show	Jan. 29-Feb. 4, 1921
Hudson, N. Y	Annual Automobile Show	Jan. 30-Feb. 5, 1921
Minneapolis	Winter Show	Feb. 5-12, 1921
Newberg, N. Y	Annual Automobile Show	Feb. 6-12, 1921
Kansas City Mo	Annual Automobile Show	Feb. 12-19, 1921
Pittsfield, Mass	Annual Automobile Show	Feb. 20-26, 1921
Deadwood, S. D	Annual Automobile Show	Feb. 21-26, 1921

Tractor Shows

Columbus, O	National Tractor Show	Feb. 6-12, 1921

Foreign Shows

London	Commercial Vehicles, Exhibition, Olympia	October
London	Passenger Car Show, Olympia	Nov. 4-13
Christchurch, N. Z	Olympia Motor Exhibition	Nov. 6-13
Brussels	Automobile Show	Dec. 10
Sydney, Australia	Motor Show	Jan. 7, 1921

Races

Los Angeles, Cal	Dirt Track	Nov. 25

Conventions

Cleveland	Service Managers' Convention	October
Salina, Kan	Auto Trades Assn. of Kansas, Annual Convention	Oct. 20
Atlantic City	National Implement and Vehicle Assn. Twenty-seventh Annual Convention	Oct. 20-21-22
Chicago	Automotive Equipment Assn	Nov. 15-20
Cincinnati	Ohio Automobile Trade Assn. Fourth Annual Convention	Dec. 8-10
Cincinnati	Annual Convention Ohio Automobile Jobbers' Assn	Dec. 8-9
Columbia, S. C	Annual Meeting South Carolina Automotive Trade Assn	Dec. 9-10
Milwaukee	Wisconsin Automotive Dealers' Assn	Jan. 19, 1921
Chicago	N. A. D. A. Annual Meeting	Jan. 31-Feb. 1, 1921

Foiling the Motor Car Thief

The chief of the Albany automobile bureau of the State of New York has invented a new trap for motor car thieves. A metal shell in two parts is so made that it can be clamped around the steering wheel and held in place by screws passing through the rim. Between the shoulders of the shell of the device is an element which is unchangeable. In this material the engine number, and the State seal is stamped. On the other side of the clamp there is a key which corresponds to files kept in the registration office where a complete description of the vehicle is on file. When a thief attempts to steal the car he must not only embed a new car number and a State seal, in a substitute element, but he must be wise enough to substitute a code number which must correspond with the key number originally in the unchangeable material beneath the clamp. Any attempt to change the engine number results in the destruction of the original chemical element used

BUSINESS NOTES

The Goodrich-Lenhart Mfg. Co., Hamburg, Pa., manufacturers of the Goodrich automotive equipment, have effected a consolidation with the wire and cable department of the Motor Parts Co. of Philadelphia.

The Elgin Motor Car Corp. is in receipt of an order for approximately $1,500,000 worth of Elgin Sixes for shipment to the various countries of Europe. The order was placed at Elgin's present prices which have not been changed and will not be changed until conditions warrant.

The Cole Motor Co., Buffalo distributors of the Maxwell, Cole and Chalmers automobiles and trucks has changed its name to the Edward H. Baker Corp. and increased its capital stock to $350,000.

Acme Universal Joint Co., Kalamazoo, Mich., has been sold to the Hartford Automotive Parts Co. who will spend $300,000 in expanding and developing the plant.

The Detroit Carburetor Corp., to manufacture the La Fehr carburetor, has been organized with the election of E. E. La Fehr, the inventor, president; T. W. Halloran, vice-president; E. W. Hotchkiss, secretary, and S. B. Solomon, treasurer.

The Elgin Motor Car Co. has purchased four acres adjoining its plant at Argo, Ill., as a site for a warehouse and service station. It is expected that work on the construction will start this fall.

The W. E. Seymour Mfg. Corp., a new $200,000 company organized at Milwaukee to manufacture piston rings and other small parts and materials for the automotive industries, expects to be in production early after November 1. W. E. Seymour, former vice-president and general manager of the A. O. Smith Corp., is president and general manager of the new corporation.

The Harry Kinsella Co., Wilkesbarre, Pa., has been appointed distributor of the Stutz car for eight counties.

The Motor Truck Engineering Co. which will open up its salesrooms in Indianapolis within a few weeks will make a specialty of designing and building motor trucks to suit the individual requirements of the customer.

The Indiana Motor Co., Indianapolis, distributors of the Columbia and Kissel Six, has reorganized with H. I. Heywood, formerly of the Brunswick-Balke-Collender Co., as secretary, treasurer and general manager, succeeding Charles P. Hornaday.

The Field Body Corp., Owosso, Mich., has been awarded a contract for the entire 1921 business of the General Motors Truck Co. on truck bodies and cabs. New models will be used and patterns now are being made.

The Kiel-Barnes Co. has been appointed distributors of the Westcott for San Francisco.

The Jefferson Rubber Co., capitalized at $500,000 to engage in the manufacture of tires, tubes and renewed casings, will locate at Jefferson, Wis.

The Williams Akron Tire Co., a new tire concern for Akron, Ohio, has been incorporated with a capitalization of $500,000.

Triangle Motors, Inc., Chicago, has been awarded the distribution of the Haynes car for sections of Illinois, northern Indiana, Iowa and two counties in Missouri.

The Anthony Kayser Sales Co., Philadelphia, has been appointed distributor for Transport motor trucks.